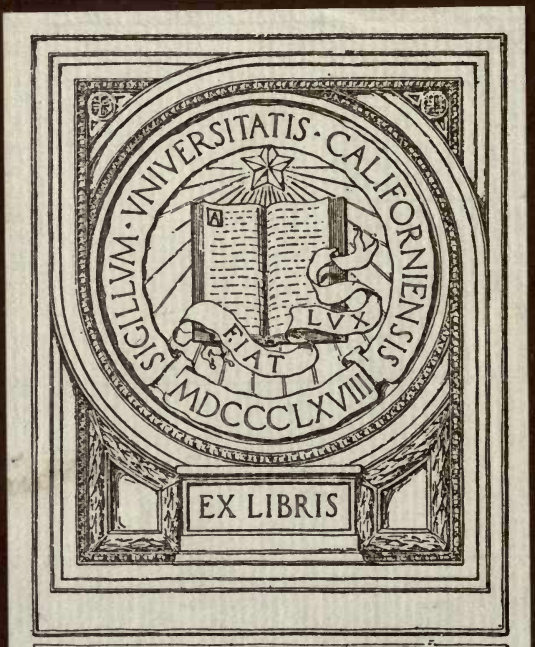

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REPORT

ON THE

UNIV. OF CALIFORNIA

BIRDS OF PENNSYLVANIA.

With Special Reference to the Food-Habits, based on over Four Thousand Stomach Examinations.

BY

B. H. WARREN, M. D.,

ORNITHOLOGIST, PENNSYLVANIA STATE BOARD OF AGRICULTURE.

SECOND EDITION, REVISED AND AUGMENTED.

ILLUSTRATED BY ONE HUNDRED PLATES.

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OFFICE OF THE ORNITHOLOGIST OF THE
STATE BOARD OF AGRICULTURE,
WEST CHESTER, PENNA., *October 1, 1890.*

To the Honorable Senate and House of Representatives of the General Assembly of Pennsylvania:

GENTLEMEN: I have the honor to transmit herewith the revised edition of the Report on the Birds of Pennsylvania, authorized by the act of April 20, 1889.

B. H. WARREN.

745192

Extract from an act to provide for the publishing of a revised edition of the Report on Birds of Pennsylvania, by the Ornithologist of the State Board of Agriculture, and the distribution of the same.

SECTION 1. *Be it enacted, etc.*, That there shall be printed nineteen thousand copies of a revised edition of the Report on Birds of Pennsylvania, by the Ornithologist of the State Board of Agriculture, size not to exceed four hundred and fifty pages and to be bound in half morrocco, and to be distributed as follows, namely: Five hundred copies for use of the Governor; one hundred copies for use of the Lieutenant Governor; two hundred copies for use of the Secretary of the Commonwealth; three hundred copies for use of the State Librarian; fifty copies each for use of Attorney General, Auditor General, State Treasurer, Secretary of Internal Affairs, Superintendent of Public Instruction, Adjutant General, Commissioner of Insurance, and Superintendent of Public Printing and Binding; one thousand copies for the use of the School Department for distribution to school superintendents, normal schools, and school libraries in the commonwealth; six hundred copies for use of the State Board of Agriculture; six hundred copies for use of State Grange for distribution through county pomona granges; three hundred copies for use of the Ornithologist of the State Board of Agriculture for distribution amongst scientists; five thousand copies for use of Senate, and ten thousand copies for use of the House, to be delivered to the members of the present legislature.

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LIST OF PLATES.

The greater part of the illustrations in this report have been copied (some alterations as to positions, etc., have been made in nearly all) from the small edition of "Audubon's Birds of America." By copying from said work which is regarded by competent critics as containing many of the finest portrayals of birds that have ever been published, the cost (ten to twenty-five dollars per plate) of original drawings was saved. The birds—most of the smaller species are about two-thirds or one-half the natural size; in larger species the reductions are greater—have been colored from specimens in the author's collection, or from those kindly loaned to him by Prof. Robert Ridgway, Curator Department of Birds, United States National Museum, Washington, D. C. Notwithstanding the fact that the "order to print" restricted the number of colors, the lithographer has, with the most careful efforts, succeeded in doing his work so accurately, that with a very few exceptions the reproductions are superior to the originals.

Plates.

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5. American Bittern (*Botaurus lentiginosus*).
6. Black-crowned Night Heron (*Nycticorax nycticorax nævius*).
7. Sora (*Porzana carolina*).
8. American Coot (*Fulica americana*).
9. Wilson's Snipe (*Gallinago delicata*).
10. Solitary Sandpiper (*Totanus solitarius*).
11. Killdeer (*Ægialitis vocifera*).
12. Bob-white or Partridge (*Colinus virginianus*).
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16. Broad-winged Hawk (*Buteo latissimus*).
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18. Screech Owl (*Megascops asio*).
19. Great Horned Owl (*Bubo virginianus*).
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20. Belted Kingfisher (*Ceryle alcyon*).
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24. Kingbird (*Tyrannus tyrannus*).
25. Blue Jay (*Cyanocitta cristata*).
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27. Red-winged Blackbird (*Agelaius phœniceus*).
28. Meadowlark (*Sturnella magna*).
29. Baltimore Oriole (*Icterus galbula*).
30. Purple Finch (*Carpodacus purpureus*).
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Plates.

33. English Sparrow (*Passer domesticus*).
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38. Tree or White Bellied Swallow (*Tachycineta bicolor*).
39. Cedar Waxwing (*Ampelis cedrorum*).
40. Red-eyed Vireo (*Vireo olivaceus*).
41. Yellow Warbler (*Dendroica æstiva*).
42. Maryland Yellow-throat (*Geothlypis trichas*).
43. American Redstart (*Setophaga ruticilla*).
44. Brown Thrush (*Harporhynchus rufus*).
45. House Wren (*Troglodytes ædon*).
46. White-breasted Nuthatch (*Sitta carolinensis*).
47. Chickadee or Black-cap Titmouse (*Parus atricapillus*).
48. Golden-crested or Crowned Kinglet (*Regulus satrapa*).
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Blackburnian Warbler (*Dendroica blackburniæ*).
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Mocking bird (*Mimus polyglottos*).
Oven bird (*Seiurus aurocapillus*).
100. Wood Thrush (*Turdus mustelinus*).
Olive-backed Thrush (*Turdus ustulatus swainsonii*).
Hermit Thrush (*Turdus aonalaschkæ pallasii*).
Wilson's Thrush (*Turdus fuscescens*).

INTRODUCTION.

The State of Pennsylvania is situated between 39° 43′ and 42° 15′ north latitude, and between 74° 42′ and 80° 35′ west longitude from Greenwich. It is bounded on the north by New York and Lake Erie; on the east by New York and New Jersey, being separated from the latter state by the Delaware river. Its length from east to west is about three hundred and ten miles, and about one hundred and sixty miles in width ("except at the angle at Lake Erie where it is one hundred and seventy-five"). It contains an area of 28,808,443 acres, of which only about 15,004,962 were improved in 1889.

"FACE OF THE COUNTRY.—No state in the Union presents a greater variety of surface than Pennsylvania. Though they do not rise to any great elevation (seldom above 2,000 feet), its mountains spread over about one-fourth of the state in parallel ridges, in a direction generally from northeast to southwest, and occupy the southern, central and eastern counties. Though all forming parts of the great Appalachian chain, they are known by various local appellations. Commencing below Easton, on the Delaware, we have the South mountain; then in order, proceeding west or northwest, the Blue or Kittatinny mountain (both entering the state from New Jersey, and passing southwest into Maryland), and the Broad mountain, which lies south of the North Branch of the Susquehanna. We now cross the river just mentioned, but still have with us the Broad mountain, under the name of the Tuscarora; passing which, we come upon another ridge, lying mostly south of the Juniata river, known as Sideling Hill; which is succeeded in turn by the Allegheny mountains proper, the dividing ridge between the Atlantic slope and the Mississippi valley. Descending the very gradual Ohio slope, we cross two inferior but well-defined chains, known as Laurel and Chestnut Ridges. As before stated, these mountains do not rise to a great height; the South mountain is within 1,000, and the Blue mountains within 1,500 feet. Broad mountain is said to rise higher above its immediate base than the Allegheny range, but to be inferior to them in elevation above the sea. These different ranges are separated by valleys, now contracted within narrow limits, and now spreading out to a width of from fifteen to thirty miles. The entire belt in Pennsylvania spreads over a space of two hundred miles—the greatest breadth the Allegheny range attains in its whole course from Maine to Alabama. In the southern part of the state the mountains become high and rugged hills; the west is also hilly, and the southeast and northwest moderately so, but occasionally level. The rivers of the western part of the state, cutting their way through the table-land, present sometimes precipitous shores of several hundred feet in height, and many valleys bear evident marks of their having been formed by running water."

"CLIMATE.—The climate of Pennsylvania is variable, and liable to sudden extremes, having sometimes the heat of the Carolinas, and at others the cold of Canada, but in periods generally of only three days, intermingled in summer with sharp winds from the northwest, and mitigated in winter by the milder breezes from the southwest. Periods of warm weather sometimes occur in January and February. * * * The mountainous region has a greater degree of cold, and the snows are deeper and lie longer than in other portions. In the west the climate is milder and less variable than in the east."

"RIVERS, LAKES, ETC.—The only lake of importance in this state is Lake Erie, which forms its northwest boundary for about fifty miles. The Delaware, which rises in the southeast part of New York, and flows southerly, separates New York and New Jersey from Pennsylvania and Delaware, and empties into Delaware Bay. It is navigable for large ships to Philadelphia, about ninety-six miles from the sea, and for sloops and steamboats to Trenton, thirty miles further up. The Susquehanna, the largest river in the state, enters Pennsylvania from New York, and flowing southerly for four hundred miles, crosses the entire state, dividing it into two unequal portions, having the larger part on the west. This river is not navigable, except at high-water in the spring and autumn, when large quantities of timber are floated down it in rafts. * * * Owing to its rapid descent to within a few miles of the Chesapeake Bay, into which it flows, it is but little affected by the tides. Its principal tributaries are the West Branch and Juniata from the west, and the Swatara and Conestoga from the east. Between the Susquehanna and Delaware are the Lehigh and Schuylkill, affluents of the Delaware, and each about one hundred miles in length. The Ohio, which is formed by the union of the Allegheny from the north, and the Monongahela from the south, drains the western part of the state, having about fifty miles of its course in Pennsylvania. It is navigable for large steamboats to its head at Pittsburgh. The Allegheny is about three hundred and the Monongahela two hundred miles in length, and both, at high-water, are navigable, the former two hundred and the latter sixty miles, for small steamers. The Youghiogheny, a branch of the Monongahela, and the Beaver, a branch of the Ohio, are small rivers. Canals coast most of these rivers, except the Monongahela and Youghiogheny, to a greater or less extent."—*Lippincott's Gazetteer.*

Lake Erie is the only lake of commercial importance, but there are numerous small lakes in many parts of the state, especially in the counties of Susquehanna, Wayne, Pike and Wyoming, where different kinds of water fowl repair during migrations. Although numerous species of aquatic birds visit Conneaut Lake, in Crawford county, and Lake Pleasant, in Erie county, they are found in greater numbers at Presque Isle Bay (also called Erie Bay) than elsewhere in the state.

In this present work the classification, nomenclature and geographical limits correspond with the A. O. U. Check List of North American Birds,* a publication representing the joint labors of a "Committee on Classification and Nomenclature" appointed by the Union at its first congress, held in New York city, September 26–29, 1883. This committee consisting of such eminent naturalists as Dr. Elliott Coues, J. A. Allen, Robert Ridgway, William Brewster, and H. W. Henshaw,

*The Code of Nomenclature | and | Check List | of North American Birds. | Adopted by the American Ornithologists' Union. | Being the Report of the Committee of the Union on Classification and Nomenclature. | (Motto.) | —— | New York: | American Ornithologists' Union. | 1886. [8 vo. pp. i-viii, 1-392. For sale by L. S. Foster, No. 35 Pine street, New York city. Price $3.00.

In order that the descriptions of birds on the succeeding pages may be clearly understood, the figures on Plate 1, with the following explanations are given :

1. Maxilla or upper mandible.
2. Lower mandible.
3. Forehead; also called front and frons.
4. Iris (Plural irides): Colored circle of the eye around the "dark spot" or pupil.
5. Upper part of throat including chin.
6. Lower part of throat or foreneck: Jugulum
7. Breast or pectus, also spoken of as pectoral region.
8. Wing-coverts (Greater, Middle and Lesser).
9. Bastard or spurious wing or Alula composed of the feathers growing on the so-called thumb.
10. Occiput; back part of head.
11. Tertiaries, Tertials, or tertiary quills are the large inner quills that grow from the humerus (arm-bone) or elbow, and in the closed wing are generally concealed by the longer scapular feathers.
12. Scapulars or scapular feathers.
13. Abdomen or belly; under surface of body from breast-bone to vent.
14. Lower tail coverts; crissum.
15. Crown or top of head.

A. Culmen. The ridge of upper mandible.

B. Cere. The naked skin at base of bill, well shown in Hawks.

C. Lore or loral space between the bill and eye.

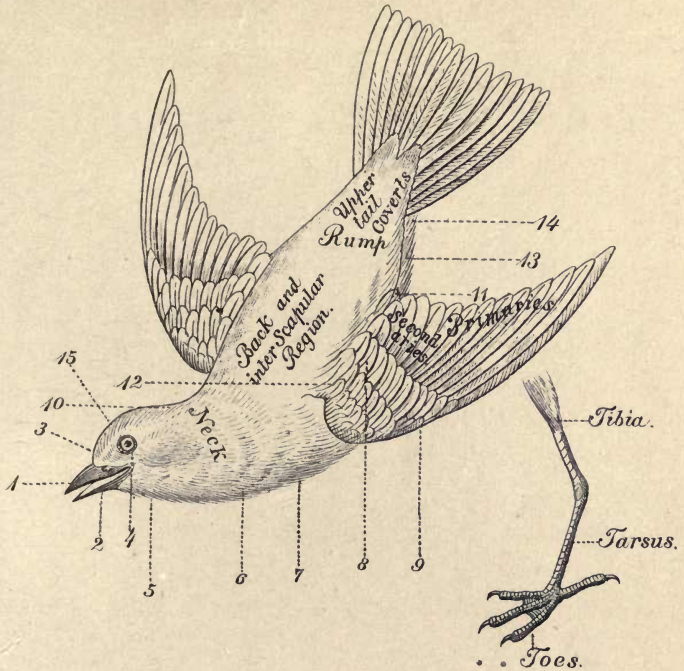
D. Gape or rictus.

S. Commissure; outlines of closed bill.

The additional technical terms — the definitions of some of which are compiled from "*Ridgway's Nomenclature* of *Colors*"*—are also employed.

Ear-coverts or Auriculars. Feathers covering the ear-opening. *Axilla.* Arm-pit. *Alar extent.* Measurement of outstretched wings. *Axillaries* or *Axillars* The (generally) soft and lengthened feathers growing from the armpit: *Adult.* This term is applied to individuals which have attained full or mature plumage ("a bird may be adult as regards organization without being of adult plumage"): *Bend of the Wing.* Angle or prominence formed at the carpus

*A | Nomenclature of Colors | for naturalists | and | compendium of useful knowledge | for ornithologists, | by Robert Ridgway, | curator, Department of Birds, United States National Museum, | with ten colored plates and seven plates of outline illustrations. | Boston: | Little, Brown, and Company. | 1886. | Price $3.00,



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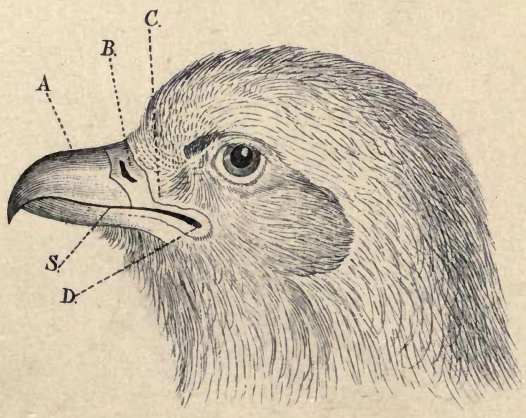

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BIRDS OF PENNSYLVANIA.

ORDER PYGOPODES. DIVING BIRDS.

SUBORDER PODICIPEDES. GREBES.

FAMILY **PODICIPIDÆ**. GREBES.

THE GREBES.

Grebes during the spring and fall migrations are very generally distributed throughout the state, and during mild winters birds of this family are often seen about the larger lakes, ponds and rivers in different sections of the commonwealth. Although these birds are generally observed singly or in pairs, occasionally, a good-sized flock is to be found. In relation to the Grebes in general it can be stated that, unless flying, they are almost always to be seen in the water. The several species of this family, owing to the posterior situation of their legs, move with considerable difficulty when on the ground, over which they go in a slow, floundering manner. Grebes, like some other kinds of aquatic birds when wounded, will conceal themselves in weeds and grasses, which grow so luxuriantly in their favorite watery retreats, where they will remain for a considerable period of time with only their slender, tapering bills above the water's surface. They swim and dive with the utmost facility; when swimming beneath the water's surface, either in quest of prey or to escape capture, it is said they use their wings in the same manner as when flying in the air. Their well-known habit of diving when alarmed, and particularly if shot at, has won for them the common name of "Hell-divers." The Grebe's nest consists of a thick, matted mass of vegetation, such as reeds, flags, grasses, etc. Sometimes the nest is built close to the water, but usually, according to Mr. Ridgway,* it is to be found "floating upon the surface of the water in grassy or sedgy ponds or marshes." The same eminent authority describes the eggs as follows: "2-5, dull white, bluish white, or very pale bluish green, usually stained more or less (often quite deeply) with light brown, by contact with decomposed vegetable matter." With the exception of the Pied-billed Grebe (*Podilymbus podiceps*), representatives of this family occurring in Pennsylvania breed, generally, north of the United States. Grebes subsist chiefly on fishes, frogs, various aquatic insects—especially beetles—and to a limited extent on different water plants. They confer no special benefits, nor are they in any particular detrimental to agricultural interests. Their flesh, quite tough and disagreeable to the taste, is seldom eaten, the feathers, however, are considerably used by milliners, and by furriers for muffs, etc. For these purposes the beautiful silvery-white plumage of the breast and abdomen is taken.

Bill acute and hard, variable in length, straight or decurved at end; higher than wide. *Head* with a naked loral space, and furnished either with bristly or variously elongated feathers, usually called tufts or crests. These crests, which render the

*A | Manual | of | North American Birds. | by | Robert Ridgway. | Illustrated by 464 outline drawings of the generic characters. | Philadelphia. | J. B. Lippincott Company. | 1887 | .

birds especially conspicuous, are commonly seen in specimens taken during the spring migrations or in the breeding season. Adults of both sexes are adorned with the parti-colored head, crests or ruffs, which disappear, however, when the birds assume their winter dress. The young, in winter, as well as the old birds, are very materially different from the adults in their nuptial plumage. *Tail* represented by a small tuft of downy feathers. *Feet* four-toed, all broadly lobed, but not webbed; the three front toes are connected at base by webs; hind toe, short free and elevated. *Claws* wide, flat and short, that of hind toe being very small. The peculiar paddle-like toes and the rudimentary tail will readily enable one to recognize a member of the Grebe family.

Genus COLYMBUS Linnæus.

Colymbus holbœllii (Reinh.).

Holbœll's Grebe.

Description.

Adult.—Bill about two inches long, acute and tapering, somewhat shorter than the head and a trifle shorter than the tarsus; upper mandible black except tomia at base and portion of base at sides which is yellow. Lower mandible chiefly yellow except on sides which are dark bluish or nearly black. Narrow, naked and blackish strip extending from eyes to bill; legs and feet blackish on outside, greenish yellow on inside. Top of head and back of neck black, with a greenish tint and somewhat glossy; the glossy green hue fades gradually at back of neck. Feathers of upper parts brownish-black, more or less glossy and edged with grayish; primaries brownish; secondaries white with black or brown shafts, some secondaries are tipped with brownish. Throat and side of head ash-gray, the latter separated from black of head by a white streak extending from under eye backward; feathers about lower mandible are also quite white; front of neck and especially the sides reddish brown; lining of the wings white. Under parts silvery white, more or less mottled with grayish, sides dusky. In some specimens the rich reddish-brown on sides of neck extends in small patches over the upper part of breast. Crests or ruffs but slightly developed.

Adult in winter and young.—Upper bill blackish-horn, yellowish at base and on tomial edges; lower bill mainly yellowish; eyes dark; crests hardly noticeable; upper parts brownish-black, head quite black; throat, sides of head and abdomen white; front part of neck and sides brownish-ash. Length about 18½ inches; extent about 32.

Habitat.—North America at large, including Greenland. Also eastern Siberia and southward to Japan. Breeds in high latitudes, migrating south in winter.

This bird, the largest of all the Grebe family found in Pennsylvania, migrates far northward to rear its young. Mr. E. W. Nelson, in his "*Report upon Natural History Collections made in Alaska*," states that "this species was not uncommon along the coast of Norton Sound in the fall, and a few isolated pairs nested each summer in the marshes. Along the course of the Yukon they are much more common, and breed in considerable numbers." Holbœll's Grebe, called also the Red-necked Grebe, is by no means as common with us as either of the other species hereafter mentioned. Specimens of this bird have been taken in different parts of the state during the spring, fall and winter months. From information which I have received, through the courtesy of naturalists and collectors in all sections of the state, it is learned that in the past twenty-five years only about a dozen of these Grebes have been cap-

tured, identified and preserved in our commonwealth, and these, with perhaps two or three exceptions, have been secured on the Susquehanna and Allegheny rivers. In the spring of 1888 Mr. George P. Friant, residing at Scranton, Pennsylvania, obtained a fine adult male of this species which had killed itself by flying through the glass in a greenhouse of one of his neighbors. Mr. James S. Nease, a careful collector, residing in Washington, Pennsylvania, has observed this bird in his county only as a rare winter visitor.

Mr. August Koch, the well-known Lycoming county (Penna.) naturalist, in a letter of June 26, 1889, addressed to me, says, in reference to Holbœll's Grebe, "I know of three instances only, when taken in our locality (yet it may occur often). The first time in winter about twenty years ago; next in the spring of 1886, when nine of these birds were noticed in a flock and several taken. My specimen is a male in spring dress. Another male in full winter plumage was kindly left to my disposition by Mr. Charles H. Eldon; it was taken the winter of 1888." Mr. L. M. Turner, of Arctic fame, in his "*Contributions to the Natural History of Alaska*," remarks that "the Eskimo name of this Grebe is *E-tä-tá-tŭk*, from its note *ta-ta-ta*." The stomachs of two of these birds examined by me contained principally sand, blades of grass, small roots and feathers.

Colymbus auritus Linn.

Horned Grebe; Dipper Duck; Little Hell Diver; Little Fish Duck.

Description (*Plate 2*).

Adult.—Bill black, with yellow or whitish tip, about 1 inch long and considerably shorter than head; iris carmine, with a fine inner circle of white; crests and ruffs well developed; head and ruff glossy black (in some specimens of a greenish hue). A brownish-yellow band, darkest in color between eyes and bill, runs over eyes and unites with long occipital tufts (horns) of same color; plumage of upper parts dark brown, margined with white and gray; secondaries chiefly white; primaries brownish-gray; greater part of neck, upper breast and also portions of the sides reddish-brown, rest of sides dusky; lining of the wings white; lower parts silvery-white; legs brownish, yellow or greenish on inside.

Young.—Bill blackish-brown; iris yellowish; ruffs and crests slightly developed; upper parts brownish-gray; feathers on back more or less edged with white or grayish; chin, throat, sides of head white; abdomen and breast silvery-white; tarsi and feet brownish. Length about 14 inches; extent about 25 inches.

Habitat.—Northern hemisphere. Breeds from northern United States northward.

This species is recorded as quite a common winter resident throughout the United States, and although sometimes found nesting within our northern limits, it retires chiefly north of the United States during the breeding period (middle of May to middle of August). Audubon (*Birds of America*) states that he found, in Ohio, near Lake Erie, in the month of July, nests containing eggs in which incubation was well advanced. Dr. Coues (*Birds of the Northwest*) mentions that he has found it breeding at various points in northern Dakota, where, in June

and July, he secured both eggs and young, the latter newly hatched. This species is recorded by Mr. E. A. Samuels as nesting in more northern latitudes than New England. The Horned Grebe is an irregular sojourner, in Pennsylvania, from the middle of October until early in April. In the months of March and April this Diver is usually more numerous than at other times during its residence with us. Although generally observed singly or in pairs, and sometimes in parties of four, five or six, I have seen, on three occasions, in the past ten years, flocks numbering from twelve to twenty-five of these birds, during the spring migrations, on the Susquehanna, Lehigh and Delaware rivers. Dr. Walter Van Fleet and Burgess J. H. Ferguson, both of Renovo, Clinton county (Pa.), recently informed me that in the latter part of March or early in April, 1884, large numbers of Horned Grebes appeared in various streams and ponds in central Pennsylvania, and remained for two or three days before passing northward. Mr. Ferguson says there were at least two hundred Grebes in the river at Renovo, where many were killed by gunners. In a small pool, less than one rod across, Dr. Van Fleet secured over twenty. Audubon, writing of the food of Horned Grebe, says: "I have observed in the stomachs of almost all that I have examined, a quantity of hair-like substances rolled together like the pellets of owls, but have not ascertained whether or not these masses are disgorged. * * * * The food of this species, while on salt water, is composed of shrimps, small fishes, and minute crustacea. While on fresh water, they procure insects, leeches, small frogs, tadpoles, and aquatic lizards; they also pick up the seeds of grasses." The stomach-contents of nine of these birds which I have examined consisted mainly of sand, remains of fish, beetles and frogs and portions of green-colored aquatic plants. In the stomachs of three specimens I have found, in addition to other food-stuffs, small ball-like masses of feathers.

Genus **PODILYMBUS** Lesson.

Podilymbus podiceps (Linn.).

Pied-billed Grebe; Little Dipper; Little Fish Duck; Hell Diver.

Description.

Adult.—Bill thick, shorter than head and higher than wide; bristly frontal feathers; no conspicuous tufts or crests; broad naked loral space; bill (dried specimen) bluish white, culmen dusky and both mandibles crossed with black band, upper parts dark brown, darkest on head and back; chin and throat with a long showy black patch; sides of head and neck brownish-gray; primaries brownish-ash; secondaries grayish and white; lower part of neck in front and upper part of breast yellowish-brown, more or less spotted or barred with black on upper portion of breast; sides darker with more or less yellowish brown; lower part of breast and abdomen satiny-white; iris brown; tarsi and feet (dried specimen) brownish.

Young.—Bill (dried specimen) brownish without black band; chin and throat pure white; neck in front and on sides rusty mixed with white; sides of head brownish

with streaks of white; lower part of breast and abdomen silky white; sides dark grayish-brown; feathers on upper part of breast on sides brownish-black edged with rusty; plumage of upper parts dark brown, somewhat grayish on top of head and about nape of neck; feathers on lower part of neck and the back are darkest. The specimen before me has a decided gloss on back feathers; the feathers on the sides about the thighs are hair-like in appearance. Length about 13½ inches; extent about 22 inches.

Habitat.—British provinces southward to Brazil, Buenos Ayres and Chili, including the West Indies and the Bermudas, breeding nearly throughout its range.

The Pied-billed Grebe, or Dabchick, is a common spring and fall visitor, and in winter it is often seen, especially in the southern counties of the state. The Dabchick is the only one of the Grebes which has been known, to naturalists, with whom I have corresponded on the matter, to breed in Pennsylvania, but as a native the bird is rare, or if it breeds at all regularly with us, it retires to such secluded situations that collectors rarely find it. In the counties of Crawford and Erie Mr. George B. Sennett has observed the species as a "moderately common spring and fall migrant," and Mr. August Koch, of Williamsport, has noted it, in his locality, only as a spring and fall visitor. Dr. John W. Detwiller, naturalist, residing at Bethlehem, Northampton county, writes me he has found it breeding here.

Prof. H. Justin Roddy, of the Millersville State Normal School, says: This Grebe about ten years ago bred in Perry county, Pennsylvania. The following interesting and valuable notes concerning the nesting habits of the Pied-billed Grebe are given by Mr. Langdon in his list-*Summer Birds of a Northern Ohio Marsh:* "The little floating island of decaying vegetation held together by mud and moss, which constitutes the nest of this species, is a veritable ornithological curiosity. Imagine a 'pancake' of what appears to be mud, measuring twelve or fifteen inches in diameter, and rising two or three inches above the water, which may be from one to three feet in depth; anchor it to the bottom with a few concealed blades of 'saw-grass,' in a little open bay, leaving its *circumference entirely free;* remove a mass of wet muck from its rounded top and you expose seven or eight soiled brownish-white eggs, resting in a depression the bottom of which is less than an inch from the water; the whole mass is constantly damp. This is the nest of the Dabchick, who is out foraging in the marsh, or perhaps is anxiously watching us from some safe corner near by.

"The anchoring blades of coarse saw-grass or flags, being always longer than is necessary to reach the bottom, permit of considerable lateral and vertical movement of the nest, and effectually provide against drowning of the eggs by any ordinary rise in the water-level such as frequently occurs during the prevalence of strong easterly winds on the lake. A small bunch of saw-grass already growing in a suitable situation is evidently selected as a nucleus for the nest, and the tops bent so as to form part of it.

"During the day we invariably found the eggs concealed by a cover-

ing of muck as above described; but as we ascertained by repeated visits at night and in the early morning they are uncovered at dusk by the bird who incubates them until the morning sun relieves her of her task."

SUBORDER CEPPHI. LOONS AND AUKS.

FAMILY URINATORIDÆ. LOONS.

THE LOONS.

Loons live almost habitually in the water; they dive with wonderful rapidity and skill, and are also remarkable for their ability of swimming long distances under the water, especially if endeavoring to elude their enemies. As divers they are the most expert of all birds. They retire during the summer season to high boreal regions to rear their young, and as cold weather advances migrate southward. During migrations Loons are most numerous about our seacoasts and on the large lakes in the interior. Like the Grebes they move over the ground in a slow, floundering and awkward manner, their flight, however, is rapid, and when migrating they generally fly at a considerable elevation. The shrill and mournful notes of these birds can be heard at a great distance; it is asserted by some that Loons, like the Cuckoos, are more frequently heard before a storm than at other times. The flesh of these birds is tough, dark-colored and "fishy." The white plumage of the under parts and the spotted feathers of the back are sometimes used by milliners and furriers.

The nest is described as a rudely-built structure of reeds, grasses, etc., on the ground near the water; the dark-colored and spotted eggs are said to be usually two in number. Bill long, hard, straight, tapering and sharp-pointed, being quite spear-like in appearance, and well adapted to catching their prey, consisting principally of fishes. Lores completely feathered. Head without crests or ruffs. Tail well developed, but very short and rounded. Legs situated far behind. Tibia mostly concealed in belly. Feet with four toes, the three in front long and wholly webbed.

GENUS URINATOR CUVIER.

Urinator imber (GUNN.).

Loon; Great Northern Diver.

DESCRIPTION (*Plate 51*).

Adult.—Bill and legs (dried specimen) bluish-black; iris, red; head and neck dark bluish-green; sides of head quite purplish; lower part of neck glossy-green; throat with transverse streak of six or eight distinct patches of white feathers; triangular patches of white streaks on sides of neck, almost uniting behind and narrowing as they extend to front of neck, where they are about one inch apart; upper parts and sides glossy-black, conspicuously spotted with white; spots on lower part of back, rump and sides are small; spots on back arranged in transverse rows, and increase in size from lower part of neck backward; sides of breast black with white streaks, lining of wings, breast, abdomen and crissum white; tail brownish-black, somewhat glossy above and unspotted.

Young.—Top of head, back and rest of upper parts brownish-black; chin, throat and lower parts white, sides of breast and sides brownish-black; back unspotted (specimens are sometimes found in which the scapular and tertial feathers are quite well marked with the square white spots so conspicuous in the full plumaged adult); iris, brown; bill (dried specimen) bluish-white, dusky on ridge and yellowish at

base; tarsi and feet brownish-yellow; length about 32 inches; extent about 55; bill along culmen about 3 inches.

Habitat.—Northern part of Northern Hemisphere. In North America breeds from the northern tier of states northward; ranges in winter south to the Gulf of Mexico.

This bird, the largest of all the Divers, is about as large as a medium-sized domestic goose. The Loon, known to many as the Great Northern Diver, is a regular and tolerably common spring and fall migrant, frequenting, principally, the rivers, larger streams and lakes. In the winter, when streams and other bodies of water are not frozen over, individuals of this species are frequently to be found with us. Although not known to breed in Pennsylvania, these birds are sometimes seen here in the breeding season. Hon. N. F. Underwood, member of the Pennsylvania State Board of Agriculture, residing at Lake Como, Wayne county, and hunters living in Wyoming and Susquehanna counties, have informed me that solitary Loons are occasionally to be found throughout the summer months, inhabiting the numerous small lakes in the northeastern parts of this commonwealth. In Lycoming county Mr. August Koch says "the Loon is a common visitor oftener to be noticed in the spring than in fall, and occasionally single birds may be noticed in the first summer months." The Loon, ever cautious and vigilant, will dive at the flash of a gun and proceed under the water to a very considerable distance before reappearing. These birds, it is said, when endeavoring to elude their enemies, and also, at times, when in quest of food, swim under the water with greater rapidity than they fly through the air. Writing of the Loon, Nuttall says, in referring to its voice, "far out at sea in winter, and in the great western lakes, particularly Huron and Michigan, in summer, I have heard, on a fine, calm morning, the sad and wolfish call of the solitary Loon, which, like a dismal echo, seems slowly to evade the ear, and rising as it proceeds, dies away in the air. This boding sound to mariners, supposed to be indicative of a storm, may be heard sometimes for two or three miles, when the bird itself is invisible, or reduced almost to a speck in the distance." The stomach contents of seven Loons, captured during the winter months in Chester, Delaware, Clinton and Lehigh counties, Pa., consisted entirely of fish-bones and scales; two other specimens, purchased in the winter of 1881 from a game dealer in Philadelphia, were found to have fed on small seeds and portions of plants, apparently roots. Individuals of this species are, it is said, sometimes found in the Hudson Bay region weighing as much as fifteen or sixteen pounds apiece. The female is somewhat smaller than the male. The weight of three females taken in Pennsylvania in the early spring ranged from seven to seven and three-quarter pounds each, and two males, one taken on the Lehigh river, in the fall, the other captured in Warren county, on the Allegheny river, in the spring, tipped the scales each at nine and three-quarter pounds.

Urinator lumme (Gunn.).

Red-throated Loon.

Description.

Bill rather slender, about two and one-quarter inches long and bluish-black; front and sides of head, chin, upper part of throat and sides of neck bluish-gray; crown, hind neck, sides and upper parts generally brownish-black, glossed, more or less, with greenish, and spotted or streaked with white; front of neck with a longitudinal and triangular patch of rich reddish-brown; under parts white; legs (dried specimen) brownish-black; iris, red in adult, and reddish-brown in young. The young and adults, in winter, lack the bright chestnut-colored patch on fore-neck, and plumage of upper parts generally is brownish-gray, conspicuously spotted with white; length about 26 inches; extent about 44 inches.

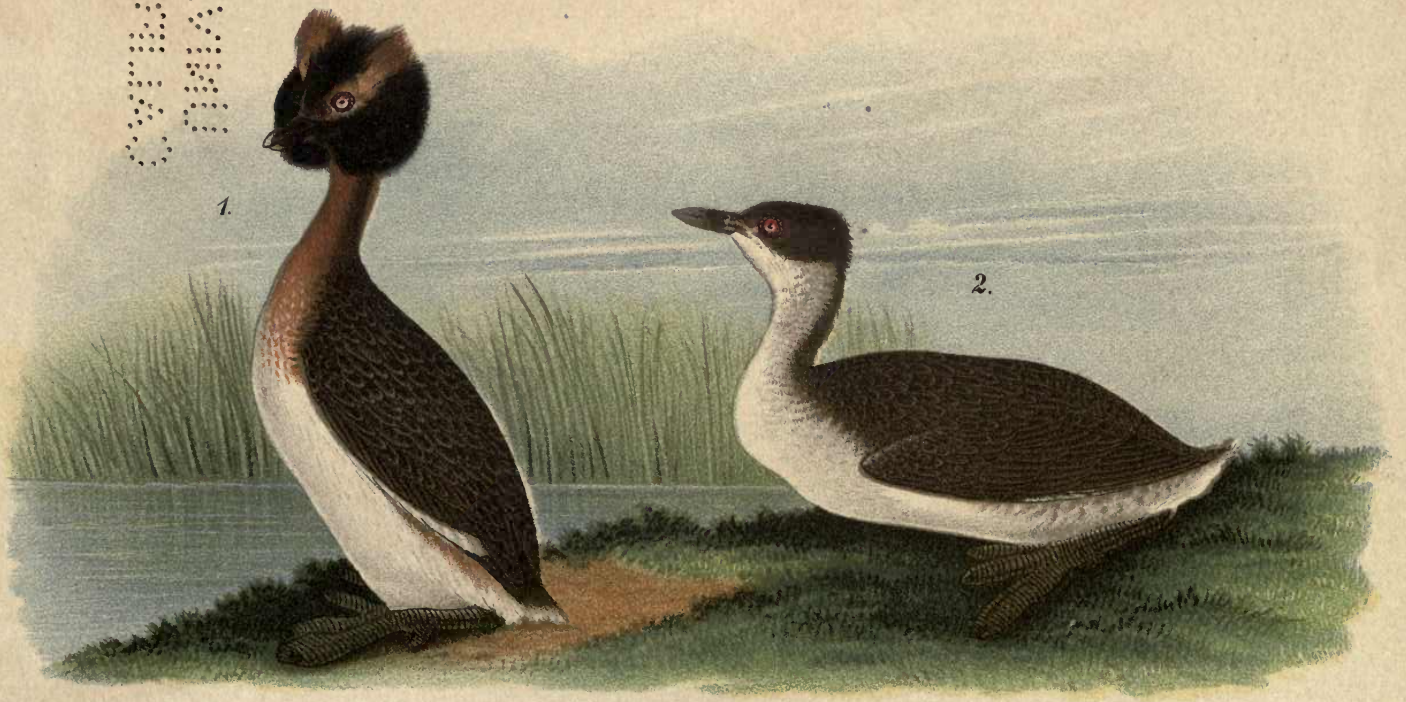
Habitat.—Northern part of Northern Hemisphere, migrating southward in winter nearly across the United States.

The Red-throated Loon, a rare and irregular visitor in this locality has been taken in the late fall, winter and early spring, in different parts of the state. Specimens have been captured in Lycoming, Clinton, Northampton and Philadelphia counties, and I have been informed that on Lake Erie, in the neighborhood of Erie city, this bird is often met with, especially late in the autumn. The individuals which come as far southward as Pennsylvania are usually young. Red-throated Loons are much more common along the sea-coast—from Maine to Maryland—in the winter season, than in the interior, and in the summer or breeding time (June and July) they retire much farther north than the Great Northern Diver. The food of this bird is similar to that of the previously described species.

Family ALCIDÆ. Auks, Murres and Puffins.

THE AUKS, ETC.

The members of this family, numbering about twenty-five species and subspecies in North America, are all exclusively marine. Many of them inhabit almost constantly the northern seas. Species are much more numerous on the Pacific coast than on the Atlantic; but few birds of this family have been observed in Pennsylvania and doubtless those taken here have been driven inland by severe storms. These birds are gregarious, certain species, especially during the breeding season, assembling in great numbers. One egg is laid on the bare ground or in crevices of rocks; high cliffs along the ocean, it is stated, are usually the favorite breeding-sites. Like the Loons, most of these birds move over the ground in an awkward manner; their flight, however, is quite rapid and they swim and dive with great address. When swimming under the water in quest of prey, particularly fish, on which they principally subsist, they employ their wings in the same manner as when flying in the air. The eggs and young of many of these birds are, it is said, quite highly esteemed as food by natives in Arctic countries, where the tough skins with their thick coatings of feathers are also considerably used to make articles of wearing apparel. In birds of this family the hind toe is absent, and the three front toes are united by a continuous web.



Horned Grebe.

1. Adult Male; 2. Female in Winter.

SUBFAMILY **FRATERCULINÆ**. PUFFINS.

GENUS **FRATERCULA** BRISSON.

Fratercula arctica (LINN.).

Puffin.

DESCRIPTION.

Adult, in winter.—Bill quite stout, flattened laterally and nearly as high as long; both mandibles with curved and distinct grooves; bill and legs (dried skin) brownish yellow; upper parts and space on front of neck brownish-black; throat and sides of head grayish-white, under parts white. Length about 13½ inches; extent about 24 inches.

Habitat.—Coasts and islands of the north Atlantic, breeding on the North American coast from the Bay of Fundy northward. South in winter to Long Island, and casually further.

The Puffin or "Sea Parrot," as this bird is frequently called, has been observed in Pennsylvania only as an accidental winter visitant. But one specimen of this species has, so far as I can learn, been captured in our state. This bird, now in the possession of Mr. Joseph Krider, of Philadelphia, was killed by a gunner in the winter, about 1876, along the Delaware river, near Chester city. The Puffins, according to different writers, breed either in crevices of high rocks or cliffs on the sea-coast, or in burrows which they dig in the ground. These holes, it is stated, are usually excavated to the depth of about three feet. "Their food consists of various kinds of small fish, particularly sprats, the smaller kinds of crabs, shrimps and sea-weeds, and it is not improbable but that their sudden migrations are regulated by the presence or absence of certain kinds of fish on which they delight to feed."—*Nuttall.*

SUBFAMILY **PHALERINÆ**. GUILLEMOTS, ETC.

GENUS **CEPPHUS** PALLAS.

Cepphus grylle (LINN.).

Black Guillemot.

DESCRIPTION.

Adult, in winter.—Bill black, sharp-pointed, quite straight and shorter than the head; head, neck, under parts, rump, and space on wing white; back, wings and tail dark brown or black, mixed with white; tarsi reddish. Length about 13 inches; extent about 23 inches.

Habitat.—Coast of northern Europe, south to Denmark and the British Islands. Coast of Maine, south in winter to New Jersey.

The Black Guillemot, an inhabitant of the dreary coasts and islands of the north Atlantic, is a rare and irregular straggler in winter on the Atlantic coast, southward to New Jersey. In Pennsylvania this species has been observed as an accidental wanderer in winter. A specimen in the museum at Lancaster city, Pa., was taken, it is said, on the Susque-

hanna river in Lancaster county. Messrs. C. D. Wood and John Krider had in their possession two or three of these birds, which, they stated, had been captured in the neighborhood of Philadelphia. Prof. H. Justin Roddy, of Millersville State Normal School, records the capture of a Black Guillemot in the late fall or winter in Perry county, Pa.

SUBFAMILY **ALLINÆ**. DOVEKIES.

GENUS **ALLE** LINN.

Alle alle (LINN.).

Dovekie ; Sea Dove.

DESCRIPTION.

Adult, in winter:—Bill very short and thick, upper mandible curved ; upper parts brownish-black, scapulars edged and streaked with white, and secondaries tipped with same ; chin, throat, sides of neck and under plumage generally white ; bill, black ; iris, dark-brown ; tarsi (in dried skin) brownish. Length about 8½ inches ; extent about 15½ inches.

Habitat.—Coasts and islands of the north Atlantic and eastern Arctic Oceans ; in North America south in winter to New Jersey ; breeds in high northern latitudes.

The Sea Dove or Little Auk, as this bird is sometimes called, very rarely migrates in winter as far southward as the coast of New Jersey. During the past ten years I have seen two specimens that have been captured in winter on the Delaware river near Philadelphia. Both of these birds were taken shortly after violent storms. In the fall of 1886 Prof. H. Justin Roddy, of Millersville, Pa., obtained one of these birds in Perry county, Pennsylvania.

NOTE.—*Cepphus mandtii* (Mandt's Guillemot) and *Uria lomvia* (Brünnich's Murre), both of which were mentioned in the first edition of *Birds of Pennsylvania*, have been omitted in this report, as I am not certain that either have been taken in our state.

ORDER LONGIPENNES. LONG-WINGED SWIMMERS.

FAMILY **STERCORARIIDÆ**. SKUAS AND JAEGERS.

THE JAEGERS.

The Jaegers or Skua Gulls inhabit principally the sea-coasts ; they also frequent the large inland waters, especially the great lakes. Two genera and four species are recorded as belonging to the fauna of the United States. In Pennsylvania the Jaegers have been noted by various naturalists only as very rare and irregular visitants. These hardy, bold and predacious birds retire mostly to the dreary arctic solitudes to rear their young. During the winter season, or at other times when migrating, they are generally found singly or in pairs, but when breeding, a well-known writer says they congregate in large numbers and nest in tufts of grass, on rocks or even on the bare ground ; the eggs, two or three in number, are described as being nearly three inches long and a little less than two inches in width, and are dark-colored,

spotted or blotched with different shades of brown and grayish. Dr. Elliott Coues says: "The Skua Gulls are eminently rapacious, whence their name of 'Jager' (hunter); they habitually attack and harass terns and the smaller gulls, until these weaker and less spirited birds are forced to drop or disgorge their prey. Their flight is vigorous; lashing the air with the long tail, they are able to accomplish the rapid and varied evolutions required for the successful practice of piracy. Thus in their leading traits they are marine Raptores, whilst the cered bill furnishes a curious analogy to the true birds of prey."

Thomas Nuttall, writing of the Jaegers, says: "They also often provide for themselves, feeding on floating objects, as they never dive, and sometimes live on the flesh of cetaceous animals, shell-fish, molusca, eggs and young birds." The head and eyes are large; neck rather short and stout; bill strong, hard and hooked at tip; "covering of the upper bill not entire, as in the *Laridæ*, the posterior half being furnished with a horny cere, the lower edge of which overhangs the nostrils; toes fully webbed; hind toe very small; claws large and strong, curved and very acute; tail slightly rounded, but the central pair of feathers projecting a greater or less distance beyond the rest."

The Jaegers like the Gulls and Terns (Laridæ) swim most buoyantly, but are incapable of diving. Representatives of this family, both adult and young, vary greatly in their plumage.

Genus **STERCORARIUS** Brisson.

Stercorarius pomarinus (Temm.).

Pomarine Jaeger.

Description.

"*Adult.*—Front, crown of the head, back, wings and tail, blackish-brown; sides and back part of the neck bright-yellow; throat and entire under plumage white, with a brand of brown spots extending across the upper part of the breast; sides and lower tail coverts barred with brown; shafts of quills and tail feathers white; bill greenish-olive, black at the tip; legs and feet black; the middle tail feathers extend beyond the others for about 2 inches; they are rounded at the end, and of a uniform breadth throughout.

"Young birds have the plumage of the upper parts blackish-brown; of the lower, grayish-brown, with the feathers of the abdomen and lower tail coverts margined with dull-ferruginous; tarsi and base of the toes and webs yellow."—*Baird's B. of N. A.* Length about 20 inches; extent about 48 inches.

Habitat.—Seas and inland waters of northern portions of the Northern Hemiphere, south in winter to Africa and Australia and probably South America. Not known to occur in winter on the Atlantic coast of North America north of Long Island.

The Pomarine Jaeger, known to the fisherman on the coasts of Maine as "Gull Hunter," resides during the summer or breeding season in high boreal regions, but when the young are able to provide for themselves both the old and young migrate southward, and frequent mainly the shores of the ocean. In this state the Jaeger occurs only as an accidental visitor. The late Prof. S. F. Baird, in the summer of 1840, secured a specimen at Harrisburg, on the Susquehanna river; another example of the same species is recorded as having been obtained by the late Vincent Barnard, of Chester county, in Lancaster county, Pa., on the Susquehanna In the winter of 1885 or 1886, Mr. C. D. Wood, a Philadelphia

taxidermist, mounted one of these birds, which had been shot by a hunter in Sullivan county, Pa., near Eagle's Mere, a popular summer resort on the Philadelphia and Reading railroad.

Stercorarius parasiticus (Linn.).

Parasitic Jaeger.

Description.

"*Adult*,—Upper part of the head blackish-brown; nape and sides of the neck yellowish-white; remainder of upper plumage blackish-brown; wings and tail darker; shafts of the primaries white; under plumage white; bill bluish at the base, black at the point; tarsi and feet black; the central tail feathers extend beyond the others about three inches; they taper slightly, varying but little in breadth until near the end, where they are abruptly acuminated, differing in this particular from all the other species.

Young.—Head and neck streaked with dark brown and brownish-yellow; lower parts spotted or barred with the same; upper parts brownish or dusky and brownish-yellow. Length about 18 inches; extent about 40 inches."—*Baird's Birds of N. A.*

Habitat.—Northern part of northern Hemisphere, southward in winter to South Africa and South America. Breeds in high northern districts, and winters from the Middle states and California southward to Brazil and Chili.

The Parasitic Jaeger, like the preceding species, occurs in Pennsylvania only as a rare and irregular straggler. Dr. Turnbull (*Birds of Eastern Pennsylvania*) records the capture of one near Philadelphia by the late John Krider. In October, 1874, Mr. Merrick Low shot, at the head of Erie bay, a fine specimen of this bird, which is now in the collection of my friend, Mr. George B. Sennett, of Erie city. Dr. Walter Van Fleet mentions both the Pomarine and Parasitic Jaegers as stragglers in Clinton county, Pa.

Never having had an opportunity of studying this species in life, I quote the following interesting extracts from Mr. E. W. Nelson's report (*Natural History Collections in Alaska*): "During summer these Jaegers show a much greater preference for marshes and the low, barren grounds so common in the north, than they do for the vicinity of the seacoast. At the Yukon mouth, and near St. Michaels, they arrive with the first open water, from the 10th to the 15th of May. The snow still lies in heavy drifts on most of the open country, but the Jaegers take possession and feed upon the shrew-mice and lemmings which are common on this ground. By the last of May they are very common, and twenty or thirty may be seen in a day's hunt.

"Birds in the black plumage are rare in the spring, but are sometimes seen, and at the Yukon mouth, on May 31, I found a pair in this plumage mated. The eggs are laid on mossy knolls or uplands, in their haunts, about the 5th of June. The nest is merely a depression in the moss, containing two eggs. The young are on the wing by the end of July and early August. The last birds move southward or keep out to sea after the 20th of September. On cloudy days, or in dusky twilight,

these birds have a habit of uttering loud, wailing cries, interspersed with harsh shrieks, which are among the most peculiar notes heard in the northern breeding grounds. At all times the Jaegers are given to wandering, and one is likely to find them almost anywhere along the coast. They are not infrequently seen harrying terns or gulls to make them disgorge fish just caught. If successful they dart down and, rising under the falling morsel, catch it in their capacious mouth. This robbery is often performed by two birds in unison, but whether the birds alternate in disposing of the spoil or not could not be learned. * * * * They are very greedy, and frequently swallow so much that they are unable to fly until a portion is disgorged."

Family **LARIDÆ**. Gulls and Terns.

Subfamily **LARINÆ**. Gulls.

THE GULLS.

Only two or three species of this group, represented by over twenty-five species and subspecies in North America, have been observed by naturalists to occur in Pennsylvania with any degree of regularity. None breed in this commonwealth where they are found only as transitory sojourners during the spring, fall and winter months. Gulls vary greatly in size; some are classed among the largest of the marine birds, while others are but little larger than their near relatives—the terns. In these birds the body is more robust than in the terns, the bill is hooked, the tail is generally even and the toes are fully webbed.

They are light, easy and graceful swimmers, but are unable to dive, though some of them secure their food by plunging for it in the same manner as terns. The sexes are similar in color, and the female is usually a trifle smaller than the male. Gulls differ greatly in their plumage, but the adults are usually white with a dark, or bluish-gray mantle; in some species the head—especially in the breeding season—is enveloped in a dark hood. The young are wholly different from the old birds, being much darker and usually more or less spotted or mottled with gray and different shades of brown. Gulls generally associate in large flocks, not only when breeding but also during the spring and fall migrations, and in winter. They inhabit chiefly the sea-coasts and large inland waters; some kinds, however, and especially the smaller species when migrating, and also frequently in winter, ascend to a considerable distance many of the principal rivers emptying in the bays and ocean.

Gulls are gluttonous and voracious, feeding on almost any kind of animal substances, fish, however, is their main article of diet. These birds, with a few exceptions, breed beyond the northern limits of the United States, and most of them retire during the season of reproduction to the arctic regions. The nest is usually built on the ground or near it, some species construct rude nests of twigs, grasses, moss, etc., while others, it is said, deposit their eggs either on the bare ground or on rocky ledges. The eggs, two to four in number, are variously spotted with different shades of black, brown and gray.

The loud, shrill and unmusical notes of these birds are most frequently heard when they are on the wing; they are, also, especially noisy when feeding, or when their nesting places are approached. The flesh of the old bird, particularly that of the larger species, is quite tough and unpalatable. The flesh of the young birds, especially the smaller kinds, is sometimes eaten by fishermen and hunters. Although the gulls are seldom used for food, unless it is by the Eskimo and other residents of the northern regions, who, it is stated, esteem the flesh of several species as great delicacies—it is a noteworthy fact that the silvery and downy feathers of these birds are largely used by our milliners.

Genus **LARUS** Linnæus.

Larus argentatus smithsonianus Coues.

American Herring Gull; Big Gull; Winter Gull.

Description.

Adult.—Head, neck, rump, tail and under parts white; mantle dull pale-blue; primaries tipped with white, and barred with black; bill yellow, with reddish spot; tarsi, flesh color; iris, yellowish-white.

Young.—Mottled with grayish-brown, white and light pearl-blue, the latter in patches on upper parts; primaries dusky; bill brownish-yellow, dark towards end; iris, brown; length about 25 inches; extent about 59 inches.

Habitat.—North of America generally, breeding on the Atlantic coast from Maine northward; in winter south to Cuba and lower California.

This species is a rather common spring and fall migrant on Lake Erie, where, during the winter months, if the weather is not exceedingly cold, these birds are also sometimes seen singly or in small companies of five or eight. Throughout the state in general this species occurs as quite a rare and irregular visitor. On the Delaware river, near Philadelphia, and on the Susquehanna, below Lancaster, Herring Gulls are perhaps more frequently observed than elsewhere in Pennsylvania, except in the vicinity of Erie city.

The Herring Gull is not especially an arctic breeder. It nests, according to different writers, along the coast and about lakes of the interior in the New England states, and also from Lake Superior northward to the Arctic shores. This species breeds generally on the ground, though sometimes high and inaccessible cliffs are selected as breeding places, and occasionally in some localities, particularly in regions where the natives collect both the eggs and young for food, they frequently, to escape such depredations, build their nests in the tops of high trees. Mr. George Spencer Morris, of Philadelphia, informs me he has observed both Herring and Ring-billed Gulls, as winter visitants, on the Delaware river, near the city.

Larus delawarensis Ord.

Ring-billed Gull.

Description.

"*Adult.*—Head, neck, under parts and tail pure white; back and wings very light pearl blue; first and second primaries black for two-thirds of their length towards the end, the three next quills have the black much less in extent, and on the sixth it is reduced to a sub-terminal bar; the first quill is black at the end, above which is a broad white band; the second quill is black to the tip, with a white spot on the inner web an inch and a half from the end; the other primaries tipped with white; secondaries and tertiaries ending in white; iris yellow; bill crossed near the end with a blackish-brown band, between which and the base it is greenish-yellow; the tip is yellow; tarsi and feet greenish-yellow. Length about 20 inches; extent about 48 inches.

"*Young.*—The upper plumage mottled with blackish-brown and gray; beneath grayish-white, with light-brown spots; primaries black; tail white, with a subterminal black band; bill black with yellow base."—*Baird's Birds of N. A.*

Habitat.—North America at large; south in winter to Cuba and Mexico.

This species occurs in Pennsylvania during the spring and fall migrations, but is not common. Specimens have been taken on the Delaware, Susquehanna, Allegheny and Ohio rivers in this state, and also at Lake Erie, near the city of Erie. Unlike most of its relatives, this Gull breeds in many sections of the United States, as well as far northward. This is one of the common Gulls to be seen, in winter, on the Atlantic coast from New Jersey southward.

Larus atricilla Linn.

Laughing Gull.

DESCRIPTION.

Adult, in breeding plumage.—Head and upper part of neck dark slate color, darkest about occiput and on neck, and lightest about base of bill; the dark color extends about one inch or more farther down front of neck than on the back of same; white spot on both upper and lower eyelids; neck all round, breast, abdomen, sides, lining of wings, upper and lower tail coverts, rump and tail pure white; the breast and abdomen in recently-killed specimens have a beautiful rosy tinge; mantle dark lead color; first five primaries black, which decreases from first to fifth. In specimen before me all the primaries but first and second are tipped with white; the secondaries and tertiaries have broad white tips; bill (dried specimen) dark carmine and somewhat yellow at base; tarsi yellowish-red; iris bluish-black.

Adult, in winter.—Head and neck white, with sides and occiput spotted with brownish-gray.

Young.—Head, neck all round and upper parts brownish-gray, darkest at base of head; mandible similar color but darker; throat and under parts grayish or dull white. Length about 16½ inches; extent about 40 inches.

Habitat.—Eastern, tropical and warm-temperate America, chiefly along the seacoast from Maine to Brazil; Pacific coast of middle America.

The Laughing Gull is so named because its notes resemble a loud burst of laughter. In this state the bird is found only as a migrant. In the spring individuals of this species frequently ascend the Susquehanna river as far as Harrisburg; they also sometimes come up the Delaware river to Philadelphia, and occasionally are observed on other of our larger streams in the eastern part of the state. In the autumn the Laughing Gull is rarely, I think, to be found in Pennsylvania. The Black-headed Gull, as this species is sometimes called, is not found on the Pacific coast of the United States, but is quite common on the Atlantic side, especially from New Jersey southward. The nest—built on the ground—is composed of sea-weed, grass or other vegetable materials. The eggs, two or three in number, measure about 2.20 inches in length by about 1.58 inches in width; they vary considerably, but usually the ground color is grayish or brownish-olive, spotted and blotched with different shades of dull reddish-brown and black or purplish; the markings are often more abundant about the larger end. The eggs of

this species are used in many sections along the Atlantic coast, especially in some of the southern states, for table purposes.

Larus philadelphia (ORD.).

Bonaparte's Gull; "Little Gull."

DESCRIPTION (*Plate 52*).

Adult.—Bill, black; tarsi (dried skin), reddish-yellow; head and upper part of neck dark lead color; lower part of neck, under parts, rump and tail pure white; mantle, pale pearl-blue; three first primaries mainly white; first primary with black outer web; first six primaries have black ends, a half inch or over long and each one is slightly tipped with white; other primaries like back. In winter the adult has white head with dark spots over ears, in other respects quite like adult in spring.

Young.—Bill, black, yellowish at base; tarsi, reddish-yellow (dried skin); iris, hazel; greater part of head, the throat, neck and under parts white; tail, white, except a black bar nearly an inch wide at end; primaries with much more black than in adult; dark colored auricular spots; crown and upper parts, espepecially the wings, mottled with light lead color and brownish-gray; length about 14 inches; extent about 32 inches.

Habitat—Whole of North America, breeding mostly north of the United States; south in winter to Mexico and Central America.

This species known to fishermen on Lake Erie and about the Delaware and Susquehanna rivers as "Little Gull," is by far the most abundant of all the Gulls in Pennsylvania, where it occurs as a regular migrant in the spring and fall. During migrations, particularly in the autumn, these birds are frequently to be seen in considerable numbers about the harbor at Erie city. Bonaparte's Gulls are found generally throughout the state, about the numerous lakes, ponds and larger streams. Occasionally in the interior good-sized flocks are noted, but usually they are seen singly, in pairs, or sometimes in small parties of four or five individuals. They generally arrive here early in April and remain mostly until early in May, when they pass northward to their breeding grounds, from which they return here usually about the first week in October and remain until early in November. At Lake Erie, where the species is perhaps more numerous than in any other section of Pennsylvania, I observed a flock of a dozen or more of these Gulls in company with two or three Herring Gulls late in the month of December, 1889. This bird, in addition to feeding on fish and other kinds of aquatic animal life, subsists, also, to a considerable extent, on different insects, particularly beetles and grasshoppers.

GENUS **RISSA** STEPHENS.

Rissa tridactyla (LINN.).

Kittiwake.

DESCRIPTION.

"*Adult.*—Head, neck, entire under plumage, rump and tail, white; back and wings light bluish-gray; the ends of the five outer primaries, and the outer web of the first, black; the fourth and fifth have small white tips; bill, greenish-yellow; iris, reddish-brown; legs and feet brownish-black, with a green tinge.

"*Young.*—The head is white, marked on the hind head and neck with bluish-gray; a spot of the same color over the ears; a narrow crescent of black in front of the eye; wings and shoulders marked with black; primaries, black; tail, white, with a subterminal black band; bill, black; rest of the plumage same as in adult."—*Baird's Birds of N. A.* Length about 17½ inches; extent about 35 inches.

Habitat.—Arctic regions, south in eastern North America in winter to the great lakes and the Middle States.

Accidental winter visitant. About ten years ago the late Henry B. Graves, of Berks county, mounted a young Kittiwake, which had been captured near Lancaster city in midwinter. Mr. Joseph Krider, of Philadelphia, has in his collection one of these birds which was shot several years ago near Philadelphia by the late John Krider. Dr. A. C. Treichler, of Elizabethtown, mentions this species as a straggler in Lancaster county, Pa. The Kittiwake is a common bird in the arctic regions, and in winter this species wanders irregularly southward along the Atlantic coast as far as New Jersey, where it is quite rare.

SUBFAMILY **STERNINÆ**. TERNS.

THE TERNS.

While these birds are most abundant on the seacoast, neighboring bays and inlets, they are not exclusively maritime; many frequent, during migrations, inland waters (large lakes commonly) where some also remain during the summer to rear their young. None of the Terns are known to breed in Pennsylvania. Although quite a number of these birds—known commonly about the seashore as "Sea Swallows"—have been taken by various naturalists and collectors, in this state, during migrations, none, according to my observations, can be said to occur throughout this commonwealth as regular or common spring and fall migrants. Several species are common on the coast of New Jersey during migrations, and some are also found there as summer residents. Almost every year, in the spring, late summer and in the autumn, after severe stormy weather, Terns of different kind are frequently noticed about the rivers, lakes and ponds in the interior, principally, however, in the eastern sections of the state. These birds, it would appear, have been, by force of the elements rather than their own inclinations, compelled to leave, temporarily, their chosen haunts in the vicinity of the ocean.

At Lake Erie, some species of this subfamily are found as common migrants; in the harbor at Erie city two or three species are more or less common every spring and fall. This is the only section in Pennsylvania, so far as I have been able to learn, where Terns are seen with any degree of certainty during migrations. Terns, with a few exceptions, are much smaller than Gulls, from which they differ also in having straight, slender, sharp-pointed bills, and, mostly, conspicuously forked tails. The sexes are quite similar in size and color, but the young and old birds in fall and winter show great variations in coloration; wings long, narrow and pointed; the flight is buoyant and graceful. They seem to be almost continually on the wing, and sometimes are seen out at sea many miles from land. Terns are unable to dive; their feet are webbed, but they are scarcely ever seen on the water; it is said they never swim from choice. These birds walk but little, though they often alight on the beach, sand-bars and rocks. Terns, especially the larger kinds, subsist principally on little fish; some of the smaller species, in addition to small fish, feed to some extent on insects. When in quest of prey they frequently make extensive circuits over the ocean, bays, brackish ponds and marshy places; in flying over the water, searching for food, they invariably are seen with the bill pointing straight downward; this, as Dr. Coues writes, "makes them look like colossal mosquitoes." They

often hover over the water, when feeding, in the same manner as the Sparrow Hawk does when hunting in a grass-field, and dart head foremost into it, oftentimes with such force as to submerge the whole body; unlike the hawk, however, which seizes his prey in his talons, the Tern captures its prey in its bill. Their notes are sharp, shrill and often repeated; they are particularly noisy when wounded or if their breeding-places are approached. The eggs, two or three in number, are generally deposited in a slight depression in the sand or shingle along the sea-beach; some few nest on drift-stuff, sea-weeds, grasses, etc., in marshes, and others, it is stated, construct rude and rather bulky nests of sticks on trees or in low, thick bushes. Terns are of a gregarious nature; they frequently nest in great numbers in suitable localities, and when migrating they often assemble in large flocks. Great numbers of these birds, and many of the smaller kinds of Gulls, are annually slaughtered along the Atlantic coast by heartless and greedy "feather hunters" to supply the millinery establishments of our large cities.

Genus GELOCHELIDON Brehm.

Gelochelidon nilotica (Hasselq.).

Gull-billed Tern; Marsh Tern.

Description.

Adult.—Bill short, stout and resembles somewhat that of a gull; top of head black, which runs downward on sides to lower eyelid; a very narrow line of white at base of upper mandible; back and wings pearly bluish-gray; tail feathers very similar to back, but lighter; lower part of back of neck and entire under plumage pure white; bill and tarsi black; iris dark brown. Length about 14 inches; extent about 34 inches.

The young have brownish-colored bills and legs, top of head largely white; upper parts more or less spotted with brown.

Habitat.—Nearly cosmopolitan; in North America chiefly along the Atlantic and Gulf coasts of the United States.

This species is a very rare and irregular visitor in eastern Pennsylvania, and in the central and western portions of the state I find no one has noted its occurrence. Mr. H. B. Graves records the capture of one "in Chester county in autumn." Mr. C. D. Wood informed me he obtained two specimens, which were shot near Philadelphia about five years ago. I have never seen this bird in Pennsylvania.

Genus STERNA Linnæus.

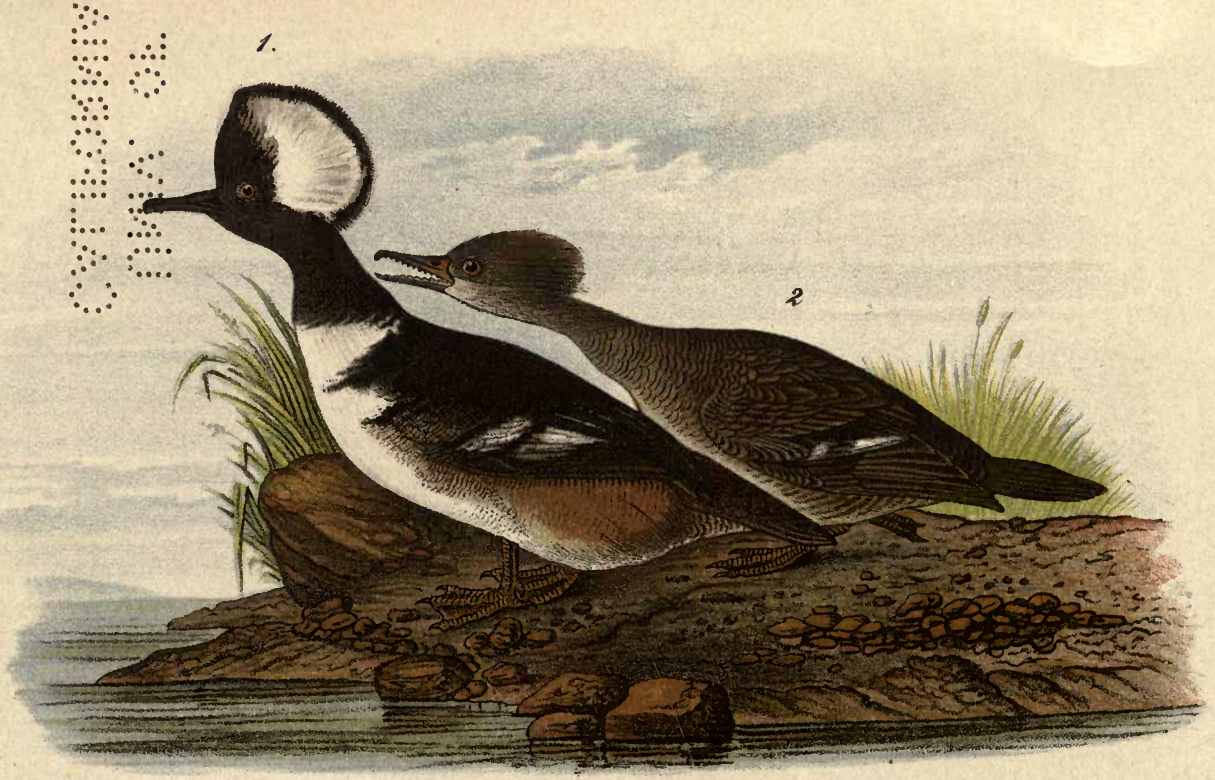
Sterna tschegrava Lepech.

Caspian Tern.

Description.

Largest of all the Terns; bill large and stout, measuring about three inches; tail very slightly forked.

"*Adult.*—Forehead, crown, sides of the head and occiput black, glossed with green; this color extends below the eye, under which is a narrow white line; back and wings light bluish-ash; outer six primaries dark slate-gray on their inner webs; quill shafts strong and white; tail and its upper coverts grayish-white; neck and entire under plumage pure white; bill and inside of mouth bright vermillion; legs



Hooded Merganser.

1. Male; 2. Female.

and feet black. Length 21½ inches; extent of wings 51 inches."—*Baird's Birds of North America.*

Habitat.—Nearly cosmopolitan; in North America breeding southward to Virginia, Lake Michigan, Texas, Nevada, California.

The Caspian Tern has been observed in but few localities in this state. Hon. J. J. Libhart, in his ornithological report, published in the history of Lancaster county, Pa., records the capture of two of these birds "on the Susquehanna at Marietta, September 21, 1847." About three years ago Mr. Joseph Krider, of Philadelphia, had in his possession an adult Caspian Tern, which a customer had brought to him to be mounted. This bird was said to have been shot in Delaware county, near Chester city. Mr. George B. Sennett has in his collection one or two specimens of this species, taken at Erie bay, where nearly every fall, in September and October, a few of these birds are seen.

Sterna maxima Bodd.

Royal Tern.

DESCRIPTION.

This bird ranks next in size to the Caspian Tern. Bill about as long but much more slender than bill of Caspian Tern; tail conspicuously forked.

Adult.—Front, top and back of head glossy-black (some specimens have front of head white); back and wings pale bluish-gray; rump and upper tail coverts white; tail nearly white; under parts white; bill deep reddish-yellow; tarsi black; iris brown. Length about 20 inches; extent about 43 inches.

Habitat.—Tropical America and warmer parts of North America, northward to Massachusetts, the great lakes and California. West coast of Africa, north to Tangiers.

The Royal Tern, which breeds in great colonies along the Atlantic coast, from Virginia southward, is a very rare and irregular visitor in this state. Henry B. Graves records the capture of a specimen in Berks county, in September, 1879. Dr. John W. Detwiller, of Bethlehem, Pa., has also observed this beautiful Tern as a straggler in our state. I have never seen this bird in Pennsylvania.

Sterna forsteri Nutt.

Forster's Tern.

DESCRIPTION.

"*Adult.*—Upper part and sides of the head, to a line just below the eye, and hind neck black; back and wings bluish-gray; primaries grayish-white on the outer webs and dusky-gray on the inner next the shaft, and over the entire web at the end, darker on the inner margin; the remaining portion of inner webs white; tail bluish-gray, except the outer web of the outer tail feather which is white; the inner web of this feather blackish-gray for about two inches from the end; rump white with a slight tinge of pale bluish-gray; sides of head, throat and entire under surface white; in the dried specimens bill is orange-yellow at the base, black near the end, with the tip pale yellow; legs and feet scarlet. Length about 15 inches; extent about 30 inches."—*Baird's Birds of N. A.*

Habitat.—North America generally, breeding from Manitoba southward to Virginia, Illinois, Texas and California; in winter southward to Brazil.

This species is found in Pennsylvania as quite a rare and irregular visitor during the spring and fall migrations. In the summer of 1879 I visited Cobb's Island, Virginia, where this Tern was breeding quite plentifully in the marshes. Forster's Tern feeds principally on little fish.

Sterna hirundo Linn.

Common Tern; Wilson's Tern; Sea Swallow

DESCRIPTION.

Adult.—Bill (dried skin) red from base to about half its length, then black, with pale-yellowish point; iris brown; legs reddish-yellow; upper part of head and hind neck black; back and wings light bluish-gray; sides of neck and head, line along base of upper mandible, chin, throat, upper and lower tail coverts and most of tail, also lining of wings, white; the outside tail feather has black outer web; sides of breast and of lower part of neck and rest of lower parts grayish-white. In the young the bill is blackish and yellow, the latter color especially on lower mandible; tarsi yellowish; front of head and entire under plumage white; crown grayish-white and black plumage about eyes, back of head and upper part of hind neck dull black; back and wings indistinct bluish-gray with patches of light-brown; most of feathers on back edged with white. Length about 14½ inches; extent about 31 inches.

Habitat.—Greater part of the Northern Hemisphere and Africa. In North America chiefly confined to the Eastern Province, breeding from the Arctic coast, somewhat irregularly, to Florida and Texas, and wintering northward to Virginia.

The Common Tern or "Sea-Swallow," as this bird is commonly called by fishermen on the coast of New Jersey, is one of few species of this group, which has been frequently found in different sections of our state during migrations. Mr. George B. Sennett has observed it as an irregular migrant in the spring and fall in the vicinity of Erie city, where, I have no doubt, it is oftener met with than in any other section of Pennsylvania. Dr. John W. Detwiller, of Bethlehem, in a letter addressed to me, says: I have shot the Common, Arctic and Least Terns on the Lehigh river in the fall, and he further adds they were "probably driven inland by severe storms." Mr. August Koch, notes the species as an irregular migrant—spring and fall—in Lycoming county, and Dr. Walter Van Fleet, of Renovo, has found it in Clinton county as a straggler. InBerks county Mr. D. Frank Keller, of Reading, reports that he has observed it as an accidental visitor; according to Dr. A. C. Treichler, of Elizabethtown, this bird is a straggler of rare occurrence in Lancaster county. Prof. J. R. Robertson, of Franklin, Venango county, mentions the Common Tern as a very rare and uncertain visitor in that locality. Several specimens of this species have been captured when migrating, particularly in the autumn, in the counties of Chester, Delaware and Philadelphia. The Common Tern breeds in New Jersey and elsewhere along the Atlantic, and also about many of the large inland lakes and ponds.

Sterna paradisæa BRÜNN.

Arctic Tern.

DESCRIPTION.

"*Adult.*—Upper part of the head and hind neck black; back and wings light grayish-blue; first primary deep-black on the outer web, dusky-gray on the inner next the shaft, and over the entire web at the end, inner margin of inner web white; the next five primaries are bluish-gray on the outer web and on the inner web next the shaft, this color extending over the entire web at the end, where it is blackish-gray on the inner margin, the remaining part of inner web white; central tail feathers and inner webs of the others white, the outer web of the outer tail feather blackish-gray, the outer webs of the two next pale bluish-gray; rump, sides of the head, and under tail coverts, white; under plumage bluish-gray, of a lighter shade than the back; bill deep carmine; iris, brown; legs and feet dark crimson. Length, 14½; wing, 10½; tail, 6½; bill, 1⅛; tarsus, ⅝."—*B. B. of N. A.*

Habitat.—Northern Hemisphere; in North America breeding from Massachusetts to the Arctic regions, and wintering southward to Virginia and California.

The Arctic Tern, is a very rare straggler in eastern Pennsylvania. About four years ago I was shown two of these birds by Mr. C. D. Wood, of Philadelphia, which he said had been shot in September on the Delaware river below Philadelphia. Dr. John W. Detwiller, of Bethlehem, has in his collection a specimen of this Tern, captured by himself on the Lehigh river in the fall. In Berks county, according to Mr. D. Frank Keller, the Arctic Tern is an accidental visitor. I have never seen the Arctic Tern in Pennsylvania, nor am I aware that any of that species, other than those mentioned above, have been taken in the state.

Sterna dougalli MONTAG.

Roseate Tern.

DESCRIPTION.

"*Adult.*—Upper part of head and long occipital feathers deep black; hind neck white; back and wings pale bluish-gray; first primary blackish-gray on the outer web and on the inner next the shaft; the other primaries bluish-gray, the second and third dusky-gray near the shaft; all the primaries white on the inner part of their inner webs; secondaries and tertiaries edged with white; tail very light pearl-gray; entire under plumage white, with a beautiful roseate tinge; bill brownish-black, orange at base; iris brown; legs and feet vermillion. Length, 16 inches; wing, 9½; (extent about 30); tail, 8; bill, 1½."—*B. B. of N. A.*

Habitat.—Temperate and tropical regions; north on the Atlantic coast of North America to Massachusetts, and casually to Maine.

Very rare or accidental visitor. I have never seen the Roseate Tern in this state, but give it in this report on the authority of Dr. L. D. Balliet, of DuBois, who writes me he has observed it as a straggler in Clearfield county, Penna.

NOTE.—In the first edition of the "*Birds of Pennsylvania*," page 232, mention was made of the capture of specimens of Roseate Terns on the Schuylkill and Delaware rivers in the neighborhood of Philadelphia. In making this statement I was in error, as I have subsequently learned the "specimens" referred to were not taken in Pennsylvania.

Sterna antillarum (Less.).

Least Tern.

DESCRIPTION (*Plate 53*).

Adult, in spring.—Length about 9 inches; extent about 20 inches. Bill yellow, with black tip; legs yellow, claws black; iris brown; a triangular white spot on forehead, extending to eye; narrow black line extending from base of upper mandible is continuous with the black of crown and region about back of head; back, wings, rump and tail light grayish-blue; two or three outer primaries black on upper surface; narrow line about base of bill above sides of head, neck and entire under parts white.

Young, in August.—Bill (dried skin) blackish-brown; lower mandible towards the base and inside of mouth yellowish-brown; tarsi yellowish; iris brown; forehead dirty brownish-white; crown and upper parts generally mottled with brown; upper part of wings mostly dark slate color; primaries darker than in old bird; under plumage white.

Habitat.—Northern South America, northward to California and New England, and casually to Labrador, breeding nearly throughout its range.

This handsome and graceful little bird is the smallest of the Terns. Fishermen on the coast of New Jersey, where the Least Tern is a common summer resident, know it by the names of "Sea Swallow," "Little Gull" and "Striker." During migrations, particularly in the latter part of August and September, Least Terns are not infrequently met with in Pennsylvania, especially in the southeastern section. I have seen seven of these Terns taken—one in the spring, the others in August and September—in the counties of Chester, Lancaster, Montgomery and Delaware in the past ten years. Hon. Gerard C. Brown, of Yorkana, has observed it in York county as a straggler. Dr. John W. Detwiller, of Bethlehem, shot one on the Lehigh river, in the fall, and in Berks county Mr. D. Frank Keller says it is an accidental visitor. According to Prof. J. R. Robertson, of Franklin, a straggler was once taken in Venango county. In the summer of 1883, at Brigantine, New Jersey, where the Least Terns were then breeding in considerable numbers, laying their eggs in slight depressions in the dry sand and among the shells on the sandhills along the beach, I obtained the bodies of over seventy-five of these Terns from two taxidermists who were collecting the skins for New York and Philadelphia dealers to be used for ladies' hats. An examination of these birds—all killed in one day—showed that they had fed almost exclusively on little fish; not more than four or five had any traces of insects in their stomachs.

Sterna fuliginosa Gmel.

Sooty Tern.

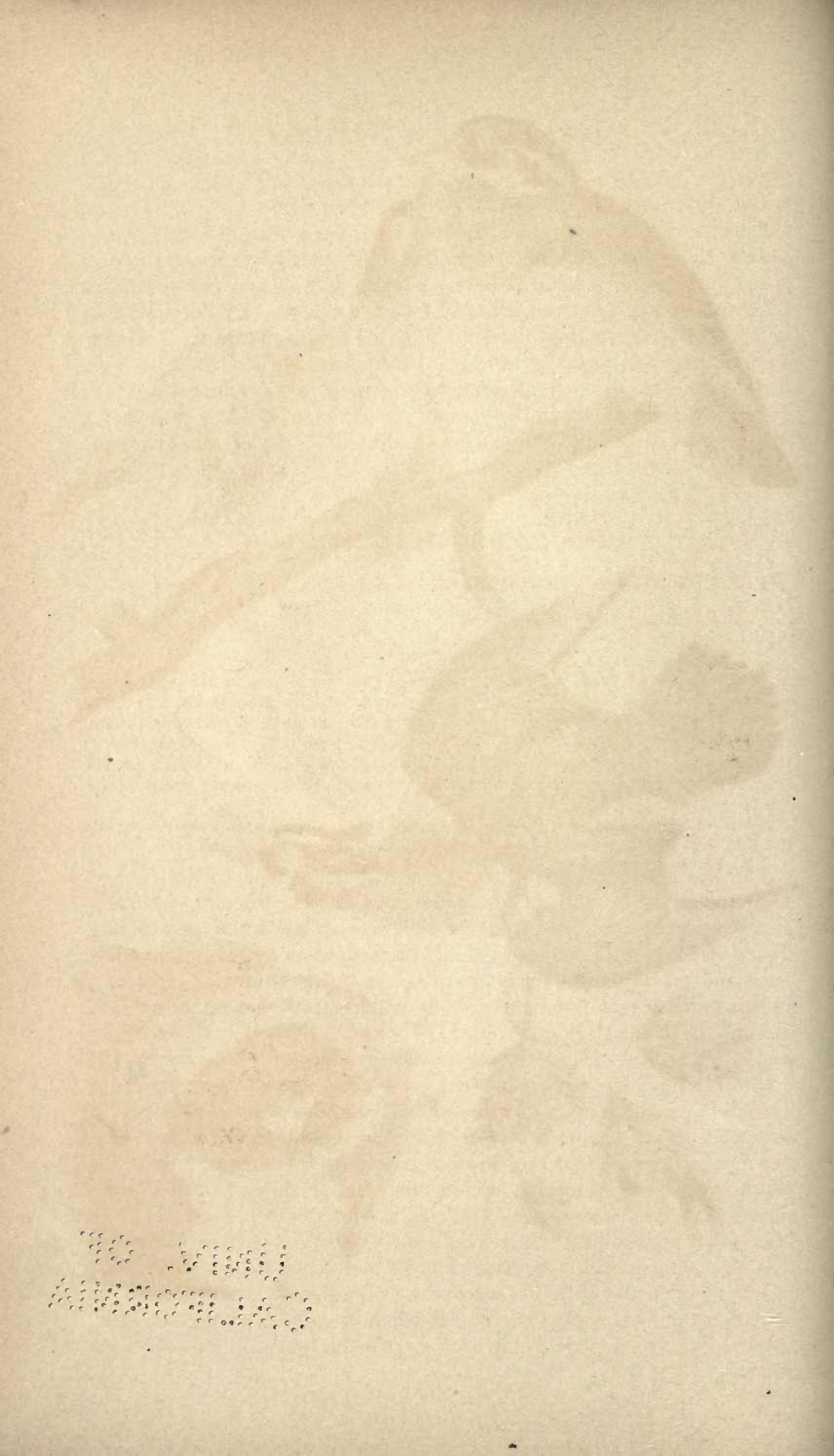
DESCRIPTION.

Adult.—Length about 17 inches; extent about 34 inches. Bill and legs black; iris reddish-brown; forehead, sides of head and entire under parts white; back, wings and upper parts deep black.

In the young the plumage is sooty-brown, darkest on back and wings, grayish on abdomen; lining of wings white; scapulars and wing coverts tipped with white.

Wood Duck—Summer Duck.

1. Male; 2. Female.



Habitat.—Tropical and subtropical coasts of the globe. In America from Chili to western Mexico and the Carolinas, and casually to New England.

The Sooty Tern is a rather rare and irregular visitor in Pennsylvania during the spring and fall migrations. About five years ago two of these Terns were taken in Delaware county, and I have two specimens in my collection that were killed in Chester county. Dr. John W. Detwiller, of Bethlehem, has observed it in his locality. Dr. A. C. Treichler mentions this bird as a straggler in the neighborhood of Elizabethtown, Lancaster county. Specimens captured in Lycoming county, in the spring and fall, are in the valuable collection of my esteemed friend, Mr. August Koch, of Williamsport. Prof. J. R. Robertson writes me that the Sooty Tern is an accidental visitor in Venango county.

GENUS **HYDROCHELIDON** BOIE.

Hydrochelidon nigra surinamensis (GMEL.).

Black Tern; Short-tailed Tern.

DESCRIPTION.

Adult, in spring and breeding plumage.—Head, neck and under parts black, darker on head and neck than on abdomen, where the color is sooty-black; edge of wing and under tail coverts white; back, wings, rump, and tail, lead color; under surface of wings somewhat lighter than the upper parts; bill (dried skin) black; tarsi brownish-yellow; iris brown. Length about 9 inches; extent about 24 inches. Adults in winter, and young in the fall have head, neck and under parts mostly white.

Habitat.—Temperate and tropical America. From Alaska and the fur countries to Chili, breeding from the middle United States northward.

The Black or Short-tailed Tern is a rather irregular, though not an uncommon visitor during the spring and fall in different sections of Pennsylvania. In North America this species has quite an extended distribution, being found both along the sea-coasts and about marshes, lakes and reedy ponds in the interior. According to various writers it breeds more or less abundantly about marshes in Wisconsin, Minnesota, Michigan, Dakota, Oregon, etc. Dr. John W. Detwiller, an ornithologist of over twenty-five years' experience, residing at Bethleham, Northampton county, Pa., writes me, that, some years ago he "procured eggs of the Black Tern upon drift-wood on Lake Erie, near Erie city." I have never had an opportunity of observing these birds when breeding, and I am not aware that they are now known to breed anywhere in the neighborhood of Erie county or elsewhere in our state. The following remarks relative to this species in the breeding season are taken from Mr. F. W. Langton's "*Summer Birds of a Northern Ohio Marsh:*" "A very common summer resident in the marsh, nesting, or rather laying its eggs on the islands of decaying vegetation and mud formed by sunken muskrat houses. Three eggs constitute a full set, and they are apparently rolled about in the mud purposely, until well-coated, so as

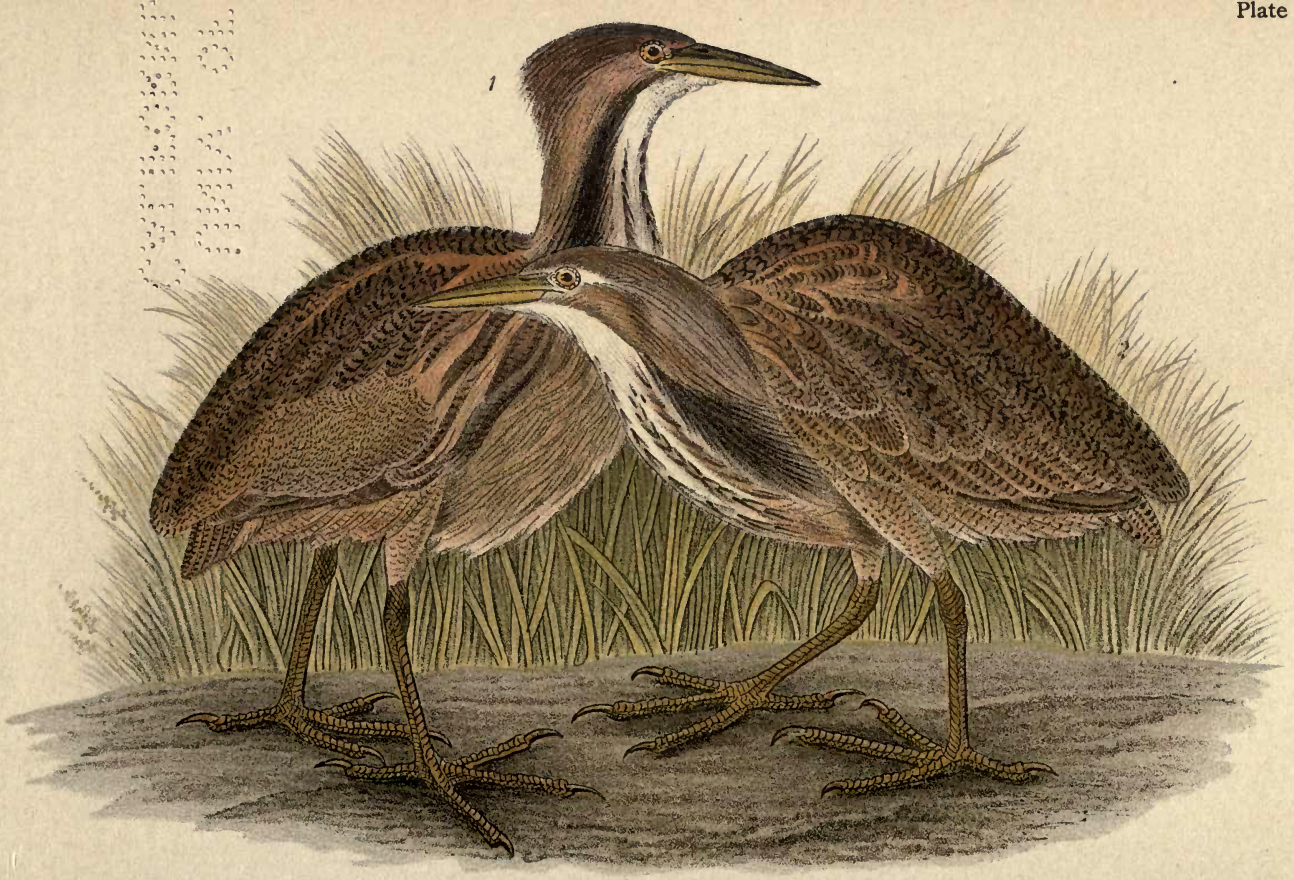
to hide the markings and thereby make them less conspicuous. In two or three instances only did we observe any attempt at a nest, and these would not have been recognized as such without the eggs, consisting as they did of merely a few fragments of grass or bulrushes so disposed as to prevent the eggs from rolling; in most cases the eggs rested in a slight depression on the bare mud. The sun appears to be their chief incubator, although the decaying vegetation of which the abandoned muskrat houses consist, doubtless plays some part in the process. In no instance did we succeed in flushing a bird from the eggs, although they would appear in pairs to the number of twenty or thirty and hover about within a few feet of our heads making a great outcry when we approached their property, which was soon to be ours by right of discovery.

"At other times the birds were not at all gregarious, being usually observed foraging singly or in pairs. Several young of the year were taken, thus confirming the statement of the resident who informed us that he had taken numbers of the eggs of the first brood in May. Of the dozen or more sets of eggs taken by us early in July, more than half were fresh or nearly so." At Erie Bay, near the city of Erie, single individuals or small flocks of these Terns are seen nearly every spring and fall. Mr. George B. Sennett, of Erie, a gentleman to whom I am greatly indebted for much valuable information concerning the bird-life of the Erie-Crawford district, has observed the Black Tern in the vicinity of Erie city only during the spring and fall. I have in my collection four Black Terns, three of which were captured in Chester county (two in fall, one in spring), the other was shot in Delaware county (September, 1880). The following-named gentlemen report the occurrence of this species in their respective localities: Lycoming county—an irregular spring and fall visitor—August Koch, Williamsport, Pa. Lancaster county—a straggler—Dr. A. C. Treichler, Elizabethtown, Pa. Venango county—a rare straggler—Prof. J. R. Robertson, Franklin, Pa. Mercer county—"one specimen shot in the spring, 1887"—S. S. Overmoyer, New Lebanon, Pa. Cumberland county—one seen in the autumn—Messrs. Wm. M. and S. F. Baird (List of Birds of Cumberland County, Pa., published in 1844).

FAMILY RYNCHOPIDÆ. SKIMMERS.

THE SKIMMERS.

Only one species of this family is found in the United States. These birds have extremely long wings and webbed feet, but like the Terns, they rarely, if ever, it is said, swim or rest upon the water. They have exceedingly odd-looking bills; both mandibles are quite flat, with blunt ends; the upper mandible is much shorter than the lower. They subsist almost exclusively on fish which they catch when skimming close to the water's surface.



American Bittern.

1. Male; 2. Female.

GENUS **RYNCHOPS** LINN.

Rynchops nigra LINN.

Black Skimmer.

DESCRIPTION.

Adult.—Length about 19 inches; extent about 50 inches. The upper mandible in specimen before me is nearly ¾ of an inch shorter than the lower; both mandibles have obtuse ends, the lower being very blunt and rounded; lower mandible much more flattened throughout its length than the upper; both edges of lower mandible are sharp, and the upper edge fits in a groove, extending along the entire length of upper mandible. Forehead, lores, sides of head, chin, throat, front of neck and rest of under plumage, tips of secondaries, sides of upper tail coverts and greater part of tail white; crown, back of neck, back, wings, most of rump and central tail feathers brownish-black; bill (dried skin) basal half yellowish (carmine in freshly killed specimens), rest brownish-black; tarsi and feet reddish-brown; the black claws are rather long, sharp and curved.

Habitat.—Warmer parts of America, north on the Atlantic coast to New Jersey, and casually to the Bay of Fundy.

This species is given as a Pennsylvania bird on the authority of the late C. D. Wood, of Philadelphia, from whom I obtained a single specimen which he assured me was shot by himself near Philadelphia, shortly after a severe storm in September, 1880. This specimen is, I believe, the only one of its species that has ever been recorded in the state. In the summer of 1883—June and August—when visiting at Brigantine Beach, New Jersey, I saw a few of these birds in flocks of seven to twelve each. Fishermen and other residents of the place informed me they bred every year in that locality. It is said that this species still breeds sparingly in New Jersey, which is, I have no doubt, about the northern limit of their breeding range. Black Skimmers were quite plentiful on several islands along the eastern shore of Virginia, where I remained for a few days in August, 1879.

ORDER TUBINARES. TUBE-NOSED SWIMMERS.

FAMILY **PROCELLARIIDÆ.** PETRELS, ETC.

THE PETRELS, ETC.

The birds of this family are strictly oceanic. The few individuals that have been observed in Pennsylvania have all been found during or after storms that have driven them inland. "The plumage is compact and oily to resist water; the sexes appear to be always alike, and no seasonal changes are determined; but some variation with age, or as a matter of individual peculiarity, certainly occurs in many cases. The food is entirely of an animal nature, and fatty substances, in particular, are eagerly devoured. When irritated many species eject an oily fluid from the mouth or nostrils, and some are so fat as to be occasionally used for lamps, a wick being run through the body. The eggs are few, or only one, laid in a rude nest or

none, on the ground or in a burrow. Petrels are silent birds, as a rule, contrasting with gulls and terns in this particular. Many or most are gregarious, congregating by thousands at their breeding places or where food is plenty."—*Coues' Key N. A. Birds.*

GENUS **PUFFINUS** BRISSON.

Puffinus major FABER.

Greater Shearwater.

DESCRIPTION.

"*Adult.*—Head above cheeks, occiput, a narrow line on the nape and upper part of back brownish-ash. paler on the hind neck; feathers of the back with lighter margins, lower part of back dark-brown; upper tail coverts of same color, terminating broadly with grayish-white; primaries and tail brownish-black, the former white on the basal part of the inner webs; secondaries and tertiaries dark brown, the secondaries white on their inner webs nearly to the end; wing coverts ashy-brown, with lighter margins; under plumage pure white, the neck nearly encircled with white; sides of the neck, anterior to the bend of the wings, marked with waving lines of pale ash; lower tail coverts dark ash, with light-gray edgings; bill yellowish-green, the tip brownish-black; iris brown; tarsi and feet livid yellow. Length about 20 inches;" (extent about 45 inches.)—*Baird's Birds of N. A.*

Habitat.—Atlantic Ocean; south to Cape Horn and Cape of Good Hope.

A single bird of this species—the only one, so far as I have been able to learn, that has been taken within our borders—is recorded by the late Dr. Ezra Michener as an accidental visitor in Chester county. I have never seen the Shearwater in its natural state, hence cannot give, from my own observations, anything concerning it. "Audubon mentions finding this species ranging from the Gulf of St. Lawrence to that of Mexico; but he very rarely met with it near the coast. In sailing to Labrador, when off the coast of Nova Scotia, one evening in June, about sunset, he observed a great number flying from the rocky shore, and believed they were breeding there. In this belief he was confirmed by the fact that hardly one was to be seen there by day, that being the time when these birds are in the habit of remaining about their nests. In September they are to be seen far from land, both by day and by night; and in calm weather they alight on the water and may then be easily approached. They swim buoyantly, and when sporting on the water present a very graceful appearance. Two that had been caught with hooks walked about as well as ducks. On being approached they would open their bills, raise their feathers, and ejected through their nostrils an oily substance. * * * They refused all sorts of food, and, being very unpleasant pets, were soon set at liberty, when, instead of flying away directly, they plunged into the water, dived about, then splashed and washed themselves, before they took to their wings, flying with their usual ease and grace, In the stomachs of those he opened Audubon found portions of fish, crabs, sea-weeds and oily substances."—*B. B. and R. Birds of N. A., Vol. ii.*

GENUS **PROCELLARIA** LINNÆUS.

Procellaria pelagica LINN.

Stormy Petrel; "Mother Carey's Chicken."

DESCRIPTION.

Adult.—Tail very slightly rounded; legs short; length about 5½ inches; bill and feet black; iris quite or nearly black; upper tail coverts white, except towards the ends, which are blackish; upper parts brownish-black; lower parts grayish-sooty black.

Habitat.—Atlantic Ocean, south on the American side to the Newfoundland banks, west coast of Africa and coast of Europe.

Accidental visitor in Pennsylvania. According to Dr. Turnbull (*Birds of East Pennsylvania*), one was captured under Market street bridge in Philadelphia. Dr. W. L. Hartman, of Pittston, mentions the Stormy Petrel as an accidental visitor in Luzerne county.

GENUS **OCEANODROMA** REICHENBACH.

Oceanodroma leucorhoa (VIEILL.).

Leach's Petrel.

DESCRIPTION.

Adult.—Legs short; larger than the Stormy Petrel, which it resembles in coloration, but is easily recognized by the forked tail.

Habitat.—North Atlantic and north Pacific Oceans; south on the coast of the United States to Virginia and California; breeds from Maine and the Hebrides northward on the coasts of the Atlantic.

Leach's Petrel is the common "Mother Carey's Chicken" to be seen on the Atlantic from Chesapeake Bay northward. This species has been observed only as a rare straggler in Pennsylvania, whither it has been driven by fierce storms of wind and rain. Dr. W. P. Turnbull (*Birds of East Pennsylvania*), says: "During a gale in August, 1842, a number were driven inland." In September, 1879, I had a specimen presented to me by the late Dr. George Martin, of West Chester, who had picked it up in his yard in an exhausted and dying condition. Captain A. A. Clay, of Rasselas, Pa., informs me that a relative of his killed one about four years ago on a small pond in Elk county.

NOTE.—The Wilson's Petrel (*Oceanites oceanicus*) has been captured, it is said, in Pennsylvania, but as my informant is not quite clear on this matter I do not deem it best to include the species in our *fauna*. The plumage of Wilson's Petrel is very much the same in coloration as the Stormy Petrel, but it differs from this latter bird in having very long legs, and the interdigital webs spotted with yellow.

ORDER STEGANOPODES. TOTIPALMATE SWIMMERS.

FAMILY PHALACROCORACIDÆ. CORMORANTS.

CORMORANTS.*

These birds are found more or less abundantly in nearly all parts of the world. About twenty-five species, it is stated, are known to science. According to different writers we have in North America eleven or twelve kinds of these curious birds. A single species is known to occur in Pennsylvania. Although most numerous on the sea-coast, many of them visit lakes and large rivers in the interior. They are of a gregarious nature, and frequently great numbers are observed together, especially when breeding. Cormorants in company with Great Blue Herons (*Ardea herodias*) and Water Turkeys (*Anhinga anhinga*) breed in considerable numbers on large lakes in the interior of Florida. The rather bulky nests are constructed principally of sticks and are built on high rocky ledges, or on trees and thick bushes; eggs, two to five in number, are a pale greenish-blue color, overlaid with a yellowish-white chalky crust. The Chinese train Cormorants to catch fish for the market. The prudent Chinaman knowing the voracious nature of his feathered servant places a band or close-fitting collar about the bird's neck before it starts from its perch in search of the finny tribe. Cormorants subsist almost entirely on fish; they are good swimmers, expert divers, but walk poorly. In these birds the body is heavy, the neck long, the long, stiff tail is composed of 12 or 14 feathers, and the four long toes are all connected by webs. All have a leathery sack at the base of the lower mandible.

GENUS PHALACROCORAX BRISSON.

Phalacrocorax dilophus (SW. & RICH.).

Double-crested Cormorant.

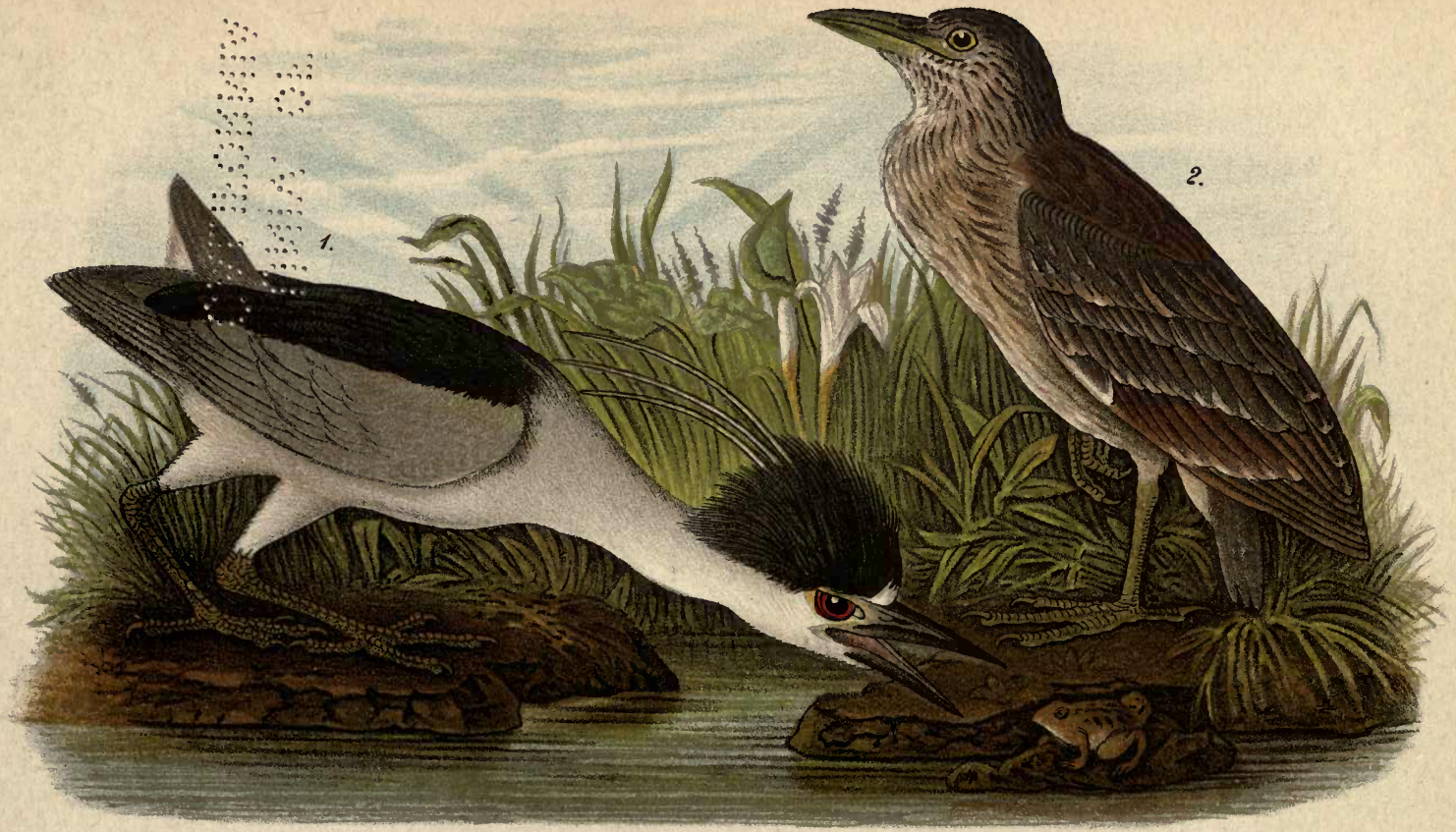
DESCRIPTION.

Adult.—Bill rather long, stout and slightly tapering; upper mandible strongly hooked and acute; gular sac naked; nostrils not visible; tail 12 feathers. Length about 30 inches; extent about 48 inches; upper mandible brownish above and yellowish on sides; lower, mainly yellow; naked skin about the eyes and gular pouch orange-yellow; inside of mouth black; iris green; legs and feet black. Head, neck, lower part of back, rump and under parts glossy greenish-black; upper portion of back and wings brownish-black, with many feathers bordered with black; curly black tufts on sides of head back of eye; tail black. Specimen taken in the fall has no lateral crests; the head and neck brownish-black and the body above and below is mainly black, with a faint greenish-gloss.

Habitat.—Eastern coast of North America, breeding from the Bay of Fundy northward; southward in the interior to the great lakes and Wisconsin.

The only locality in this state where the Double-crested Cormorant has been observed appears to be on the lake shore in Erie county, where Messrs. George B. Sennett and Mr. James Thompson, both residing in Erie city, inform me it occurs as a somewhat rare and irregular visitor late in the fall or early winter. October 26, 1889, when shooting ducks on the "peninsula" near Erie city, Mr. James Thompson and a com-

* In the first edition of the *Birds of Pennsylvania*, page 232, the Cormorant (*P. carbo*) was given as a "very rare, or accidental winter visitor," and that Mr. H. B. Graves had obtained one in Berks county. I have recently ascertained that the bird referred to was not captured in Berks county or in Pennsylvania.



Black-crowned Night Heron.

1. Adult; 2. Young.

panion saw three of these birds fly down to their decoys; one, a fine male, was shot and kindly presented to me by Mr. Thompson. From the stomach of this specimen a fish—known locally as "buffalo-sucker"—measuring between eight and nine inches in length was taken. Mr. Sennett has one or two Cormorants in his collection, captured recently in the locality above-mentioned.

Family **PELECANIDÆ**. Pelicans.

THE PELICANS.

Pelicans are large-sized birds, with long, large, straight, rather broad and sharply hooked and acute bills; they have short stout legs and webbed feet. Below the lower mandible and connected with throat is a large sac or pouch, capable of considerable expansion; the capacity of this pouch, which is largest in the brown pelican, will hold when distended, it is stated, over a gallon. In writing of these birds Dr. Coues (*Key to N. A. Birds*) says in referring to the bill, "this organ is used like a dip-net to catch fish with; when it is filled, the bird closes and throws up the bill, contracts the pouch, letting the water run out of the corners of its mouth and swallows the prey. Pelicans feed in two ways; most of them, like our white one, scoop up fish as they swim along on the water; but the brown species plunges headlong into the water from on wing, like a gannet, and makes a grab, often remaining submerged for a few seconds. Neither species often catches large fish; they prefer small fry of which several hundred may be required for a full meal. The prevalent impression that the pouch serves to convey live fish, swimming in water, to the little pelicans in the nest, is untrue; the young are fed with partially macerated fish disgorged by the parents from the crop. As Audubon remarks, it is doubtful whether a pelican could fly at all with its burden so out of trim"—(*Coues' Key*). On the ground they move awkwardly, but when flying they progress in a slow yet easy manner by a regular flapping of the wings; they swim gracefully. The white species, it is said, like some of the Cormorants, has been tamed and taught to catch fish. The nest, a bulky structure of sticks, grass, etc., according to different writers, is placed usually on the ground, and sometimes in trees or low bushes; the eggs, from one to four in number, are described as a dull white, with a roughened chalky shell and more or less blood-stained. Three species found in the United States inhabit chiefly the temperate and tropical regions; they frequent sea-coasts, bays, large rivers, and also many of the large lakes in the interior.

Genus **PELECANUS** Linnæus.

Pelecanus erythrorhynchos Gmel.

American White Pelican.

Description.

Length 5 or 6 feet; extent 8 to 9½ feet; weight is said to range from 15 to 20 pounds.

Adult.—General color pure white; primaries black; lengthened feathers of head and breast light-yellow; bill, pouch, legs and feet yellowish.

Habitat.—Temperate North America, north in the interior to about latitude 61°, south to Central America; now rare or accidental in the northeastern states; abundant in the Middle Province and along the Gulf coast; common on the coast of California and western Mexico.

The White Pelican is a very rare and irregular visitor in Pennsylvania. At long intervals stragglers of this species have been observed on the Delaware and Susquehanna rivers. Mr. George B. Sennett, of Erie,

informs me a few of these birds were seen, about fifteen or twenty years ago, in the neighborhood of Erie city. Dr. Walter Van Fleet, of Renovo, mentions it as an accidental visitor in Clinton county. About five or six years ago three or four of these Pelicans were seen on the Susquehanna river, at Keating; one of them was shot and is now in the possession of a gentleman residing at Renovo, Pa., a delightful summer resort in the mountains, on the Philadelphia and Erie railroad.

ORDER ANSERES. LAMELLIROSTRAL SWIMMERS.

FAMILY ANATIDÆ. DUCKS, GEESE, AND SWANS.

THE DUCKS, ETC.

The ducks, geese and swans, according to Dr. Coues (*Key to N. A. Birds*), are represented by nearly one hundred and seventy-five species, inhabiting all parts of the world. Of this large number there are probably about fifty kinds which occur regularly in different parts of the United States, as residents or during migrations. In Pennsylvania nearly twenty species are found during the spring and fall migrations and in winter. But few species are now known to breed regularly in this state; in fact, the Wood Duck (*Aix sponsa*), it seems, is the only one that may be said to be at all common and fairly well distributed (in the wooded and thinly populated districts chiefly) as a breeder. Several species are also found in different sections of the state as rare and irregular visitants, and occasionally a few others, which have wandered considerably from their common range, are captured here. The Canada Goose, the Mergansers, the Wood, Ruddy and Buffle-head ducks, and some few other kinds are met with quite frequently about the rivers, creeks, lakes, and numerous ponds in nearly all parts of the state. The great majority of the members of this important family which visit here are, however, found mainly on the large rivers—especially the Susquehanna—and about the shores of Lake Erie.

The best locations for duck shooting in this state are at different points on the Susquehanna, from Harrisburg southward, and at Erie bay, where several species are quite numerous every year during the regular migrations. "It is not easy to overrate the economic importance of this large family. It is true that the Mergansers, some of the sea ducks and certain maritime geese that feed chiefly upon animal substances, are scarcely fit for food; but the great majority afford a bounteous supply of sapid meat—a chief dependence, indeed, with the population of some inhospitable regions. Such is the case, for example, in the boreal parts of this continent, whither vast bands of water-fowl resort to breed during the fleeting Arctic summer. Their coming marks a season of comparative plenty in places where hunger often pinches the belly, and their warm, downy covering is patched into garments almost cold-proof.

"The general traits of the anserine birds are too well known to require more than passing notice. They are salacious to a degree, remarkable even in the hot-blooded, passionate class of birds; a circumstance rendering the production of hybrids frequent, and favoring the study of this subject. If we recall the peculiar actions of geese nipping herbage, and of ducks 'dabbling' in the water, and know that some species, as the Mergansers, pursue fish and other live prey under water, we have the principal modes of feeding. Nidification is usually on the ground, sometimes in a hollow tree; the nest is often warmly lined with live feathers; the eggs are usually of some plain pale color, as greenish, drab or creamy; the clutch varies in number, commonly ranging from half a dozen to a dozen and a half. The young are

clothed in a stiffish down, and swim at once. Among the ducks and Mergansers marked sexual diversity in color is the rule; the reverse is the case with swans and geese. A noteworthy coloration of many species, especially of ducks, is the *speculum*—a brightly-colored, generally iridescent area on the secondary quills. Most of the species are migratory, particularly those of the northern hemisphere; the flight is performed in bands, that seem to preserve discipline as well as companionship, and with such regularity that no birds are better entitled to the claim of weather-prophets."—*Coues' Key to North American Birds.*

SUBFAMILY **MERGINÆ.** MERGANSERS.

THE MERGANSERS.

The Mergansers, or Fishing Ducks, are probably the most common of all "wild ducks" about our smaller streams and ponds during the winter season. Mergansers can easily be recognized by the bill, which is long (two inches or more in length), hooked, almost cylindrical, quite slender and furnished with saw-like teeth. Like the Loons, Cormorants, etc., these birds, when swimming under the water, employ their wings in the same manner as when flying in the air. They subsist almost exclusively on fish; their flesh is dark colored, quite tough and unpalatable. Three species of this subfamily are found in the United States, and all occur in Pennsylvania.

GENUS **MERGANSER** BRISSON.

Merganser americanus (CASS.).

American Merganser; Goosander; Fish-duck; Sheldrake.

DESCRIPTION.

Nostrils large and situated about in middle of bill; bill longer than head; feathers of forehead extend beyond those on sides of bill. Legs and bill chiefly red; iris in male carmine and in female reddish-yellow.

Male.—Head and upper part of neck very dark glossy-green; head slightly crested; upper part of back black; lower part of neck, breast and greater part of wings (the latter crossed by black band) white; under parts salmon-colored.

Female is somewhat smaller than male, and has a rather conspicuous occipital crest; head and neck reddish-brown; upper parts ashy-gray; lower parts similar to male, but much paler. Length about 26 inches; extent about 33 inches.

Habitat.—North America generally, breeding south to the northern United States.

This species, the largest of the Mergansers, is found generally throughout the state as a common spring and fall migrant, and in winter it occurs quite frequently in many parts of the state, particularly in the southern counties. The American Merganser is the most abundant of the three species inhabiting this region, and in former years it unquestionably bred regularly in various localities in Pennsylvania. Nuttall gives an interesting account of the discovery of a female Merganser with a brood of eight young, not larger than the egg of a goose, on the Susquehanna river (Pa.) in May, 1832. In 1844 the Messrs. Baird* recorded this species as breeding in Perry county, and in the ornithological report of the late Judge Libhart, published about twelve or fifteen years

* List of birds found in the vicinity of Carlisle, Cumberland county, Pa., by William M. and Spencer F Baird, published April, 1844; *American Journal Sciences and Arts, Vol. XLVI.* Hereafter whenever reference is made to the Baird List, it will apply to this publication.

ago in the history of Lancaster county, Pa., the Goosander, also the Red-breasted and Hooded Mergansers are all mentioned as breeding in Lancaster county. According to Mr. E. A. Samuels (*Our Northern and Eastern Birds*) this species "is one of the most abundant summer residents in the lake region of northern Maine." Dr. Walter Van Fleet, of Renovo, Pa., says this Merganser breeds in Clinton county. Prof. August Koch, of Williamsport, Pa., in a letter addressed to me dated June 26, 1889, writes as follows: "The Hooded and American Mergansers are regular breeders (in Lycoming county); have taken the young of both before they were able to fly." From all the information I can obtain the Goosander has not been known to breed for many years past anywhere in Pennsylvania other than the counties of Clinton and Lycoming, and in both of these localities Dr. Van Fleet and Prof. Koch have observed the species to be a rare summer resident, but common in the spring and fall and of frequent occurrence in the winter when the streams are not frozen over. I have never had the good fortune to find a nest of this species, but according to different writers it usually builds its nest of leaves, grasses, moss, feathers and down, in hollow trees; "eggs 6—8, elliptical, buff-colored, 2.75 x 2."—*Coues.*

This species, like all other of our "wild ducks," is exceedingly shy and difficult to approach. According to Audubon, "the food of the Goosander consists chiefly of fish, but also of bivalve shells, snails, leeches, aquatic lizards, crays and frogs. Its voracity is great, so that it consumes an extraordinary quantity of fish. I have found fishes in its stomach seven inches in length, and of smaller kinds, so many as to weigh more than half a pound. Digestion takes place with great rapidity, insomuch that some which I have had in captivity devoured more than two dozen of fishes about four inches in length, four times daily, and yet always seemed to be desirous of more."

The stomachs of nine of these Mergansers, which I have examined, contained only the remains of fish.

Merganser serrator (Linn.).

Red-breasted Merganser; Fish duck.

Description.

Nostrils narrow and situated near base of bill; bill longer than head; frontal feathers do not extend beyond those on side of bill; both sexes have long and pointed occipital crests. Legs and bill are red, brighter in male than female; iris carmine.

Male.—Head and upper part of neck front and back dark-green; white ring about lower part of neck; jugulum brownish-red, with black and dusky streaks; back black; under parts yellowish-white; wings crossed by two black bars.

Female.—Head grayish reddish-brown; upper parts grayish lead color; throat and under parts yellowish-white and sides grayish. Length about 24 inches; extent about 32 inches.

Habitat.—Northern portion of Northern Hemisphere; south in winter throughout the United States.

The Red-breasted Merganser, a summer resident chiefly north of the United States, appears to be the rarest of the three species in Pennsylvania, where it is found frequenting, usually, rivers and large creeks from late in October until early in April. Formerly, according to Dr. Turnbull, Judge Libhart, and some few other writers, this duck occasionally reared its young in this state. None of these birds, however, have been observed for many years past in Pennsylvania as summer residents, and I am inclined to believe that this Merganser is not now found with us as a breeder.

The nest and eggs are described by Audubon, as follows: "In Labrador, as well as in several parts of the United States, where I have found the nests, they were placed within a very short distance of the margins of fresh-water ponds, among rank grasses and sedges or beneath low bushes. * * * The nest is made of dry weeds and mosses of various kinds, and is warmly lined with down from the breast of the female bird, for the male leaves her as soon as she has completed the laying of the eggs, the number of which I have never found to exceed ten, they being more frequently six or eight. It is a very remarkable fact that the eggs in this family of birds are usually even in number, whereas in most land birds they are odd. * * * The eggs resemble in form those of the domestic fowl, and are of a uniform plain, dull yellowish cream-color."

The stomachs of three Red-breasted Mergansers, which I have examined, contained only the remains of fish.

Genus **LOPHODYTES** Reichenbach.

Lophodytes cucullatus (Linn.).

Hooded Merganser.

Description (*Plate 3*).

Nostrils rather long and narrow; frontal feathers extend beyond those on sides of bill; iris in both sexes yellow; bill shorter than head; head with a conspicuous, compressed semicircular crest, smaller in the female than the male.

Adult Male.—Head, chin, neck all round, and back, black; white on sides of breast in front of wing, crossed by two black crescents, the triangular-shaped centre of crest, under parts, and speculum (the latter crossed with two black bars) white; sides reddish-brown, barred with dusky; bill brownish-black, trasi (dried skin) dark brownish-yellow.

Female Adult.—Bill (dried skin) upper mandible brownish-black, except edges about base and lower mandible yellow; tarsi and feet dark-brown; top of head dark glossy-brown; chin and upper part of throat whitish, breast and under parts mostly white; neck reddish-brown, lightest on sides and darkest on back and lower parts; back and sides dark-brown; less white on wings than in male. Length about 17 inches; extent about 25 inches.

Habitat.—North America generally, south to Mexico and Cuba, breeding nearly throughout its range.

This handsome bird, the smallest of the Mergansers, is found generally throughout North America. Nuttall remarks that in winter it migrates as far south as Mexico. The Hooded Merganser breeds in various portions of the United States, and also far northward. Dr. Coues (*Birds of the Northwest*) states that it "breeds in northern Dakota and also on the upper Missouri and Milk rivers." I have seen eggs of this bird which were labeled "Maine," and am informed that young, but a few days old, have been taken in New York State. In Pennsylvania this species is rather common, and is generally seen singly or in pairs, sometimes in flocks of five or eight, in rivers and ponds during the spring, fall and winter months. A few of these ducks are also observed here in summer, but as natives they are quite uncommon, and they have of late years been found breeding only in a few secluded localities in our state. Prof. H. Justin Roddy, of Millersville, Pa., in a letter dated July 15, 1889, says, "The Hooded Merganser does not now breed regularly in Perry county (Pa.), but I have the last two years secured young specimens; one last June (1888), and one this year in the same month. They formerly bred regularly along Sherman's creek, near the Warm Springs." Mr. August Koch, of Williamsport, informs me this Merganser is a regular but rare breeder in Lycoming county. The late Wm. V. Rambo, of West Chester, had in his collection two adults (male and female) of this species which were captured four years ago, in midsummer, in Union county. I have an adult female taken June 23, 1890, in Chester county, where this Merganser is seldom seen in summer. "The Hooded Mergansers that remain with us nestle in the same kind of holes or hollows as the Wood Duck; at least I have found their nests in such situations seven or eight times, although I never saw one of them alight on the branches of a tree, as the birds just mentioned are wont to do. They dive as it were directly into their wooden burrows, where, on a few dried weeds and feathers of different kinds, with a small quantity of down from the breast of the female, the eggs, five to eight in number, are deposited. The young, like those of the Wood Duck, are conveyed to the water by their mother, who carries them gently in her bill; for the male takes no part in providing for his offspring, but abandons his mate as soon as incubation has commenced. The affectionate mother leads her young among the tall, rank grasses which fill the shallow pools or the borders of creeks, and teaches them to procure snails, tadpoles and insects."—*Audubon.*

I have noticed that the Hooded Mergansers are usually to be found about mill-ponds and other small bodies of water, while the other two species are mostly found frequenting the shallow borders of the larger streams.

During the summer months these birds are said to feed on fishes and various forms of aquatic insects. In the following table will be found the stomach contents of eleven Hooded Mergansers examined by myself:

No.	Date.	Locality.	Food Materials.
1	November 23, 1881,	Chester county, Pa.,	Remains of fish.
2	December 24, 1882,	Philadelphia Market, Pa.,	Remains of fish.
3	January —, 1883,	Philadelphia Market, Pa.,	Remains of fish.
4	January —, 1883,	Philadelphia Market, Pa.,	Remains of fish.
5	February 20, 1884,	Delaware county, Pa.,	Remains of fish.
6	April 3, 1884,	Chester county, Pa.,	Remains of fish.
7	March 26, 1887,	Chester county, Pa.,	Remains of fish.
8	March 26, 1887,	Chester county, Pa.,	Remains of fish.
9	November 20, 1889,	Philadelphia Market, Pa.,	Remains of fish.
10	November 20, 1889,	Philadelphia Market, Pa.,	Remains of fish.
11	June 23, 1890,	Chester county, Pa.,	Fish and beetles.

Subfamily **ANATINÆ**. River Ducks.

THE RIVER DUCKS.

About three dozen representatives of this subfamily are attributed by different modern writers to North America, and of this number probably fifteen species occur quite regularly in Pennsylvania. Many of these ducks feed principally on a vegetable diet and are highly esteemed as food, but others, especially those that inhabit sea-coast regions, and subsist almost entirely on different forms of aquatic animal-life as mollusks, shrimps, etc., have usually coarse, dark-colored and unpalatable flesh. All are good swimmers and some of them are expert divers.

Genus **ANAS** Linnæus.

Anas boschas Linn.

Mallard.

Description.

Bill little longer than head, broad and flattened toward the rounded end.

"*Male.*—Head and upper part of neck glossy-green, which is separated from the dark chestnut-brown of lower part of neck and breast by a white ring. Under parts and sides, with the scapulars, pale-gray, very finely undulated with dusky; other scapulars with brownish tinge; fore part of back reddish-brown; posterior more olivaceous; crissum and upper tail coverts black; tail externally white; wing coverts brownish-gray the greater coverts tipped with white and narrowly with black; speculum purplish-violet, terminated with black; a recurved tuft of feathers on rump.

"*Female.*—Wing same as in male; under parts plain whitish ochrey, each feather obscurely blotched with dusky; head and neck similar, spotted and streaked with dusky; chin and throat above unspotted; upper parts dark-brown, feathers edged with reddish-brown."—*Baird's B. of N. A.*

Length about 24 inches; extent about 35.

Habitat.—Northern parts of Northern Hemisphere; in America south to Panama and Cuba, breeding southward to the northern United States.

Common spring and fall migrant, much more numerous on the Susquehanna river and about the lake shore in Erie county than elsewhere throughout the state. Large flocks of these ducks are to be seen every spring and fall frequenting the grassy ponds on the peninsula at Erie bay, where, Mr. James Thompson, of Erie city, informs me, a few stragglers remain sometimes during the summer and rear their young. The Mallard's nest, placed on the ground, generally close to the water, is made up of dried grasses, weeds, feathers, etc. The eggs are described

by Dr. Coues as follows: "8–10, 2.25 × 1.60, smooth, dingy, yellowish-drab." The stomachs of fifteen Mallards, killed on the Susquehanna river near Perryville, Md., in the spring and fall, which I have examined, contained only vegetable substances, mostly grasses and seeds.

Anas obscura GMEL.

Black Duck; Dusky Duck; Black Mallard.

DESCRIPTION.

Size about the same as Mallard (*A. boschas*). Bill very similar in size and shape to that of the Mallard. The sexes are alike, and although resembling somewhat the female Mallard (*A. boschas*), they can readily be distinguished from the latter by their darker color and the conspicuous white under wing coverts. Bill greenish-yellow; tarsi yellowish; iris brown; general color brownish-black, each feather edged with rusty-brown or grayish; primaries and most of tail feathers dusky-brown. Speculum violet and black (narrowly tipped with white in male); feathers on top of head dusky-brown, with rusty or grayish edgings. Sides of head, chin, throat and upper part of neck grayish-white, with dark streaks, and in some specimens a yellowish tint on throat; lower part of back black.

Habitat.—Eastern North America, west to Utah and Texas, north to Labrador, breeding southward to the northern United States.

Spring and fall migrant but much less common than the Mallard. Hunters residing in the northeastern part of Pennsylvania assert that a few of these ducks are occasionally seen in summer frequenting the numerous ponds or lakes in Susquehanna and Wayne counties, where possibly they occur as rare or irregular breeders. Dr. John W. Detwiller, of Bethlehem, Pa., mentions the Dusky Duck as having been found by himself breeding in our state; and Mr. W. K. Park, of Athens, Penna., has found this duck nesting in Bradford county. The Black Duck breeds on the ground; its eggs and nest are said to be very similar to those of the Mallard. The food of this species is chiefly of a vegetable character.

Anas strepera LINN.

Gadwall; Gray Duck.

DESCRIPTION.

"*Male.*—Head and neck brownish-white, spotted with dusky; top of head tinged with reddish; lower part of neck with fore part of breast and back blackish, with concentric bars of white, giving a scaled appearance to feathers; interscapular region, outermost scapulars and sides of body finely waved transversely with black and white. Middle wing coverts chestnut, the greater velvet black, succeeded by a white speculum, bordered externally by heavy gray, succeeded by black; crissum and upper tail coverts black; inside of wing and axillars pure white; bill black.

"*Female.*—Bill dusky, edged with reddish; wing somewhat like that of male, but with chestnut-red more restricted. Length about 22 inches; extent about 34 inches." —*Baird's B. of N. A.*

Habitat.—Nearly cosmopolitan. In North America breeds chiefly within the United States.

Regular but rather rare spring and fall migrant; not known to occur in Pennsylvania as a summer resident. Although this species is not common in the vicinity of Erie, good-sized flocks are sometimes seen in company mostly with other species about Erie bay, where the Gadwall appears to occur in greater numbers than in other parts of the state.

Anas americana GMEL.

Baldpate; American Widgeon.

DESCRIPTION.

Bill shorter than head and rather narrow.

Male.—Bill (dried skin) dark blue, black at base about feathers and at end; tarsi brownish, webs and claws darker; iris brown; tops of head yellowish-white (more or less spotted in younger birds); broad patches of glossy-green on sides of head extend from eyes backward; back of neck also more or less glossed with green; feathers in front of eyes, sides of head and neck, chin, throat and most of neck, grayish and faint yellowish-white, spotted or banded with black; fore neck and breast light brownish-red, with a faint grayish-gloss (a young male before me has brownish-red of breast spotted with black); sides of body somewhat brighter reddish-brown, with fine blackish streaks; lower part of breast and belly white; upper back and scapulars reddish-brown, waved with dusky; rump lighter than lower back and finely waved or streaked with dusky and whitish; crissum glossy black; large white space on upper surface of wing; speculum glossy-green in a large velvety-black area. The female is easily recognized by the wing markings and the reddish-brown is duller than in male. Length about 21 inches; extent about 34 inches.

Habitat.—North America, from the Arctic ocean south to Guatemala and Cuba.

Regular but rather rare spring and fall migrant; not known to occur in Pennsylvania as a summer resident. Although not common in the neighborhood of Erie, good-sized flocks are occasionally seen, particularly in the fall, about Erie bay, where this species appears to be found, irregularly, in greater numbers than in other parts of the state. I have examined the food materials of three Baldpates taken in Pennsylvania; two had fed almost entirely on insects, chiefly beetles and crickets; the other one had in its stomach a green-colored vegetable substance, and small brown and yellowish seeds.

Anas carolinensis GMELIN.

Green-winged Teal.

DESCRIPTION (*Plate 60*).

Bill quite narrow and shorter than head. One of our smallest species measures about 14 inches in length by about 24 inches in extent.

Adult Male.—Bill (dried skin) blackish; tarsi brownish-yellow; iris brown; head and greater part of neck chestnut; chin and forehead blackish; a broad, green patch extends backward from region of eyes; under part white or whitish; feathers of upper breast light reddish-brown edged with grayish; breast with numerous black spots; white crescent in front of wing; lower part of neck, scapulars, side of breast, and body, finally waved with grayish-white and black; crissum black in

middle, and brownish-yellow on each side; speculum bright green, bordered on front with dark reddish-brown of the greater coverts and posteriorly by whitish tips of secondaries.

Female.—Can easily be recognized by the wing, which is like that of male but duller.

Habitat.—North America, breeding chiefly north of the United States, and migrating south to Honduras and Cuba.

Common spring and fall migrant and casual winter visitor. The Green-winged Teal although frequently met with on many of our small creeks and ponds is generally much more plentiful about the principal rivers. Late in August and in September these birds are quite common at Erie bay where many of them are shot for the market. Individuals of this species are occasionally captured during the early summer months at Erie bay. Prof. August Kock, of Williamsport, says the Green-winged Teal occurs as a rare breeder in Lycoming county, Pa. The nest is placed on the ground; the eggs are a light greenish-buff color and measure about $1\frac{3}{4}$ inches long by about $1\frac{1}{4}$ inches broad. The food of these ducks consist principally of seeds of different grasses and weeds; they also eat different insects, and in a few instances I have found fragments of chestnuts and wild grapes in their stomachs.

Anas discors Linn.

Blue-winged Teal.

DESCRIPTION.

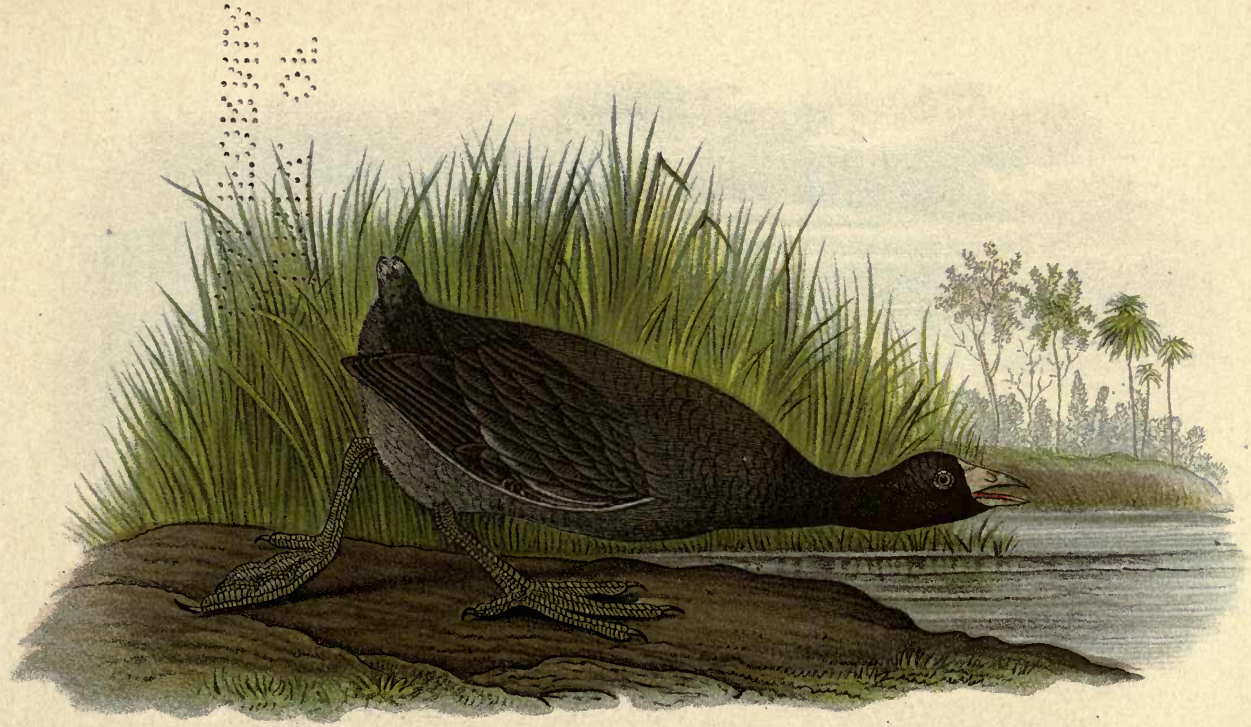
Bill broader than in Green-winged Teal and about as long as head.

Adult Male.—Bill black; feet and legs yellowish; iris brown; top of head, chin, and feathers bordering white spaces in front of eyes blackish; rest of head and upper part of neck dull lead color; feathers of lower part of neck and foreback spotted with black and margined with white and grayish-brown; lower part of back and rump dull brown; crissum black; sides of tail coverts, more or less glossed with green, white patch on each rump; wing coverts and outer webs of few scapulars sky-blue; greater coverts tipped with white; speculum bright green with narrow white tip behind.

Female.—Chin and throat yellowish-white and unspotted; head and neck dark colored with grayish and yellow; upper parts generally dark-brown, feathers edged with grayish; wings with conspicuous sky-blue patches; lower parts grayish-white with obscure dusky spots. Length about 16 inches; extent about 30 inches.

Habitat.—North America in general, but chiefly the eastern province; north to Alaska and south to the West Indies and northern South America, breeds from the northern United States northward.

This species, a regular and somewhat common migrant in the spring and fall, is more numerous in this state in September, than at other times during their residence with us. The Blue-winged Teal inhabits mainly muddy ponds, pools and sloughs, where it collects different seeds and other vegetable materials, which constitute its chief bill of fare.



American Coot.

GENUS **SPATULA** BOIE

Spatula clypeata (LINN.).

Shoveller; Spoonbill.

DESCRIPTION.

Bill much longer than head, spoon-shaped, being twice as wide toward the end as at base. In any plumage may be distinguished from other species by its odd spoon-like bill.

Male.—Bill (dried skin) black; tarsi brownish-yellow; iris reddish-yellow; head and upper neck all round dark glossy green; top of head in specimen before me is glossy black with purplish reflection; lower part of neck and fore breast and patches at base of tail on each side, also most of lining of wings white; wing coverts and some of the scapulars on outer webs blue; scapulars also conspicuously striped with black and white, fore back brownish-black mixed with white, and many of feathers edged with grayish; lower part of back black.

"*Female.*—With wing similar, but blue of wing and coverts less distinct; head and neck brownish-yellow spotted with dusky; the belly with a decided chestnut tinge." Length about 21 inches; extent about 32 inches.

Habitat.—Northern hemisphere. In North America, breeding from Alaska to Texas; not abundant on Atlantic coast.

The Shoveller is a rare and rather irregular spring and fall migrant in all sections of the state. When found here this species is usually seen singly, or in pairs, and occasionally, though very seldom, small flocks are found. The Shoveller does not breed in Pennsylvania.

GENUS **DAFILA** STEPHENS.

Dafila acuta (LINN.).

Pintail; Sprig-tail.

DESCRIPTION.

Bill a little longer than head and rather narrow; neck long; tail of male long and pointed.

Male in Spring.—Bill black-bluish on sides; tarsi brownish lead color with greenish tinge; webs black; head, and about half of neck above dark-brown, glossed with green; black stripe on back of neck, on either side of which is a long white stripe, connecting with white of lower half of neck and breast and abdomen; back and sides grayish with fine transverse lines of black and white; lesser wing coverts gray; speculum greenish-purple, with a buff border in front and a black and white border posteriorily; crissum and long central tail feathers black, other tail feathers light-gray; scapulars and long tertiaries striped longitudinally with black and silver-gray. Length (depends on development of tail, which is usually 5 or 6 inches long) about 28 inches; extent about 35 inches.

"*Female.*—With only a trace of the markings of the wing; the green of speculum brownish with few green spots; feathers of back are brown with a broad U or V-shaped brownish-yellow bar on each feather anteriorily; sometimes these bars in the shape of broad transverse lines."—*Baird's B. of N. A.*

Habitat.—Northern hemisphere. In North America breeds from the northern parts of the United States northward, and migrates south to Panama and Cuba.

The Pintail Duck is a regular spring and fall migrant, but rare winter

visitor in Pennsylvania. This species is one of the first to arrive in spring, being seen here often early in March frequenting principally the rivers and other larger streams.

Genus **AIX** Boie.

Aix sponsa (Linn.).

Wood Duck; Summer Duck; Acorn Duck.

Description (*Plate 4*).

Bill high at base and shorter than head, the latter crested.

Male Adult.—Head with conspicuous green and purple crest; sides of head iridescent purple, streak of white from base of bill to occiput, streak back of eye continuous with that of throat pure white; sides and front of lower neck and fore part of breast bright-chestnut with fine white spots; lower parts generally white; upper surface of wings beautifully marked with iridescent metallic hues. Female with grayish head and lengthened feathers behind; throat white; fore neck, upper breast and sides brownish-yellow, and streaked with grayish; upper parts generally dark-brown glossed with purple chiefly. Length about 19 inches; extent about 28 inches.

Habitat.—Temperate North America, breeding throughout its range.

The Wood Duck is a resident, and breeds in various sections of this commonwealth. During the breeding season it generally is found about streams and ponds in heavily wooded and thinly populated districts. In Pennsylvania this species is rare in winter and most plentiful in autumn. The Wood Duck is an abundant winter resident in Florida, where it also breeds. I have seen downy young of this bird which were captured late in March, 1885, in Orange county, Florida. "The Wood Duck breeds in the Middle states about the beginning of April, in Massachusetts a month later, and in Nova Scotia, or on our northern lakes, seldom before the first days of June. In Louisiana and Kentucky, where I have had better opportunities of studying their habits in this respect, they generally pair about the first of March, sometimes a fortnight earlier. I never knew one of these birds to form a nest on the ground or on the branches of a tree. They appear at all times to prefer the hollow, broken portion of some large branch, the hole of our large Woodpecker, or the deserted retreat of the fox squirrel; and I have frequently been surprised to see them go in and out of a hole of any one of these, when their bodies, while on the wing, seemed to be nearly half as large again as the aperture within which they had deposited their eggs. Once only I found a nest (with ten eggs) in the fissure of a rock, on the Kentucky river, a few miles below Frankfort. Generally, however, the holes to which they betake themselves are either over deep swamps, above cane-brakes, or on broken branches of high sycamores, seldom more than forty or fifty feet from the water. They are much attached to their breeding places, and for three successive years I found a pair near Henderson, in Kentucky, with the eggs, in the beginning of April, in the abandoned nest of the Ivory-billed Wood-

Wilson's Snipe—Common Snipe.

1, Males; 2, Female.

pecker. The eggs, which are from six to fifteen, according to the age of the bird, are placed on dry plants, feathers, and a scanty portion of down, which I believe is mostly plucked from the breast of the female. They are perfectly smooth, nearly elliptical, of a light color, between buff and pale-green, two inches in length by one and a half in diameter. "No sooner has the female completed her set of eggs than she is abandoned by her mate, who now joins others, which form themselves into considerable flocks, and thus remain apart till the young are able to fly, when old and young of both sexes come together, and so remain until the commencement of the next breeding season. * * * * If the nest is placed immediately over the water the young, the moment they are hatched, scramble to the mouth of the hole, launch into the air with their little wings and feet spread out, and drop into their favorite element; but whenever their birth-place is some distance from it, the mother carries them to it, one by one, in her bill, holding them so as not to injure their yet tender frame. On several occasions, however, when the hole was thirty, forty, or more yards from a bayou or other piece of water, I observed that the mother suffered the young to fall on the grasses and dried leaves beneath the tree, and afterwards led them directly to the nearest edge of the next pool or creek."—*Audubon.*

In some twenty odd examinations that I have made of these birds, which were killed in Florida in March and April, 1885, I found only vegetable substances, consisting chiefly of various small seeds, had been fed upon.

The food materials of eight Wood Ducks, taken in the fall and early winter months, in or near Pennsylvania, are given in the following table:

No.	Date.	Locality.	Food Materials.
1	September —, 1878, . . .	Chester county, Pa., ...	Acorns.
2	September —, 1878, . . .	Chester county, Pa., ...	Acorns.
3	September —, 1878, . . .	Chester county, Pa., ...	Acorns and small seeds.
4	September —, 1878, . . .	Chester county, Pa., ...	Small seeds.
5	October 4, 1880, . . .	Philadelphia Market, Pa., .	Acorns.
6	October 4, 1880, . . .	Philadelphia Market, Pa., .	Small seeds and other vegetable matter.
7	November 20, 1883, . . .	Philadelphia Market, Pa., .	Small seeds.
8	November 3, 1882, . . .	Philadelphia Market, Pa., .	Small seeds.

Genus **AYTHYA** Boie.

Aythya americana (Eyt.).

Red-head.

Description (*Plate 62*).

Bill broad and flattened, little shorter than head.

Adult Male.—Bill dull blue, the end black; tarsi grayish-blue; iris reddish-yellow; head and half or more of neck all round rich glossy-reddish chestnut; rest of neck, fore part of body above and below, lower part of back, upper and lower tail coverts blackish; back, scapulars and sides finely waved with black and white lines; belly white, darker toward the vent; wing coverts ashy-gray with minute white spots; speculum light bluish-gray, edged internally with black.

Female.—Iris plain yellow; head and neck grayish-brown; chin and upper part of throat very light; upper parts brownish; wings about same as in male. Length about 22 inches; extent about 32 inches.

Habitat.—North America; breeding from California and Maine northward.

Spring and fall migrant, more numerous about Erie bay and the Susquehanna river than in other sections of the state; occasional winter visitant. Some few years ago while hunting along the Brandywine creek, near West Chester, Pa., I suddenly came upon a flock of thirteen Red-heads busily engaged in feeding. As they arose from the water I succeeded in killing two of them. Assisted by my honored friend, Benjamin M. Everhart, I made an examination of the stomachs of these two birds and found that both fed exclusively on "wild celery," *a somewhat common, though not abundant aquatic plant in this locality. The food of this species varies according to locality and circumstances. Wilson says the Red-head is a common associate of the Canvas-back, frequenting the same places and feeding on the stems of the wild celery. Audubon, writing of the Red-heads, states: "I have found their stomachs crammed with young tadpoles and small water-lizards, as well as blades of the grasses growing around the bank. Nay, on several occasions, I have found pretty large acorns and beech-nuts in their throats, as well as snails, entire or broken, and fragments of the shells of various small unios, together with much gravel."

I have examined the stomach contents of twenty-one Red-heads, both sexes, which have been killed during the shooting season at Havre-de-Grace, Maryland, and found only gravel and vegetable matter, the latter consisting mainly of the so-called "wild celery" (*Vallisneria spiralis*).

Aythya vallisneria (Wils.).

Canvas-back.

DESCRIPTION.

Bill high at base, larger than head, rather narrow and somewhat tapering.

Male.—Bill blackish; legs dark-gray; iris red; head and upper part of neck dark reddish-brown; feathers on top of head and about bill blackish; otherwise quite

* "This plant, like many others, has a variety of local names. Some of the most common which I now call to mind are tape grass, from the tape-like appearance of the long leaves; channel-weed, as it frequently grows in channels where the water flows, not swiftly; eel-grass, this name arises, it is said by Dr. Darlington (*Flora Cestrica*), 'from the habit which eels have of hiding under the leaves which are usually procumbently floating under the water's surface.' The appellation 'wild celery'—a local term applied, I think, chiefly by gunners and watermen at Havre-de-Grace and vicinity—is, I consider, like many vulgar synonyms, a misnomer, as this plant is in no particular related to celery, which by botanists is known as *Apium*. 'Wild celery,' or as it is more generally known in this vicinity (Chester county, Pa.), as 'eel-grass,' is found in the Brandywine creek growing in slow running water.

The scientific name of the plant is *Vallisneria spiralis* (Linn.), the generic name being given in honor of *Antonio Vallisneri*, an Italian botanist; the specific *spiralis* is applied in consequence of the fact that the fertile stalk in its development assumes a spiral form. It is a remarkable dioecious, herbaceous plant on account of its mode of fertilization. It grows entirely under water, has long, radical grass-like leaves, from one to three feet long and from one-fourth to three-fourths inch wide. The female flowers float on the surface at the end of long thread-like spiral scapes, which curiously contract and lengthen with the rise and fall of the water. The male flowers have very short stems or scapes, from which the flowers break off and rise to the surface, to fertilize with their pollen the attached floating female flowers."—*B. M. Everhart's Botanical Publications, November, 1886.*

similar to preceding species. Female has dark reddish-brown eyes; bill black, and with the exception of bill is very similar to female Red-head. Length about 23 inches; extent about 33 inches.

Habitat.—Nearly all of North America, breeding from the northwestern states northward to Alaska.

This well-known and highly-esteemed game bird is found as a tolerably frequent spring and fall migrant, and occasionally as a winter visitor on the Susquehanna river, southward from Harrisburg. In other sections of our state it appears to occur only as a rare or casual visitor. Audubon, writing of the food of the Canvas-back, says: "It varies according to the season and locality. The plant *Vallisneria*, on which it is said to feed when on the headwaters of the Chespeake, is not found equally abundant in other parts, and even there is at times so reduced in quantity that this duck, and several other species which are equally fond of it, are obliged to have recourse to fishes, tadpoles, water-lizards, leeches, snails and mollusca, as well as such seeds as they can meet with, all of which have been in greater or less quantity found in their stomachs."

My examinations of four of these ducks, which were killed at Havre-de-Grace, showed only vegetable substances, which I judged to be remains of *Vallisneria.*

Wilson asserts that the Canvas-backs when feeding on the *Vallisneria* eat *only* the roots, and, on the other hand, the Red-heads feed on the stems of this plant.

Aythya marila nearctica Stejn.

American Scaup Duck; Big-Black-head; Blue-bill.

DESCRIPTION.

Bill blue, rather broad and heavy, and about as long as head; tarsi dark lead color; iris yellow; head, neck fore part of breast black; sides of head glossed with green; lower part of back, including rump, tail and coverts black and dark-brownish (but black predominates); speculum, greater portion of under plumage, white; inter-scapulars, scapulars and sides grayish or white, with five irregular black and transverse lines; wing coverts brownish.

Female.—Conspicuous patch of white about base of maxilla; head, neck, sides an upper parts generally brown and blackish; lower part of breast and belly, except lower part which is brownish-gray, white. Length about 20 inches; extent about 33.

Habitat.—North America, breeding far north.

The Big Black-head or Blue-bill, as this species is usually known to sportsmen, is a moderately abundant spring and fall migrant, and generally a few remain with us in winter. This and the Little Black-head, and occasionally other species, are often found together in flocks. This duck feeds principally on different kinds of aquatic animal life (other than fish) and it also, sometimes, eats seeds and the tender parts of several kinds of plants which grow in our rivers.

Aythya affinis (Eyt.).

Lesser-Scaup Duck; Little Black-head.

Description (*Plate 62*).

Very similar to the previously described species, measuring about 16 inches in length and about 28 inches in extent; head glossed with purplish-violet.

Habitat.—North America in general, breeding chiefly north of the United States, migrating south to Guatemala and the West Indies.

The Little Black-head or Little Blue-bill, a common spring and fall migrant, is found generally throughout the state. At Erie bay it is one of the most common ducks, being found there regularly, when migrating, in large flocks. During mild winters small, scattered flocks of this species are frequently met with in this region. Dr. Walter Van Fleet, of Renovo, Pa., informs me that about four years ago he saw a pair of these ducks for two consecutive seasons, during the summer months, inhabiting an extensive marshy meadow in Northumberland county, Pa., where he believes they bred. In the winter of 1885 I found the Little-Blue-bill in immense flocks at Lake George, Florida, where it is known as the Raft Duck.

Aythya collaris (Donov.).

Ring-necked Duck.

Description.

Very similar to Black-head; male with narrow brownish ring about middle of neck; speculum gray; back blackish; head and neck above ring black, glossed with green and purplish violet. Female has brownish head and neck, chin, sides of head and ring about eye whitish. Bill in male is black, lighter at base and at end, and in female is brownish-black; tarsi, bluish-gray; eyes yellow. Length about 18 inches; extent about 28 inches.

Habitat.—North America, breeding far north and migrating south to Guatemala and the West Indies.

The Ring-necked Duck is a regular and reasonably common spring and fall migrant in this state. At Erie bay it is often found in company with other species, particularly the Little Black-head. The Ring-necked Duck feeds largely on seeds of different aquatic plants.

Genus GLAUCIONETTA Stejneger.

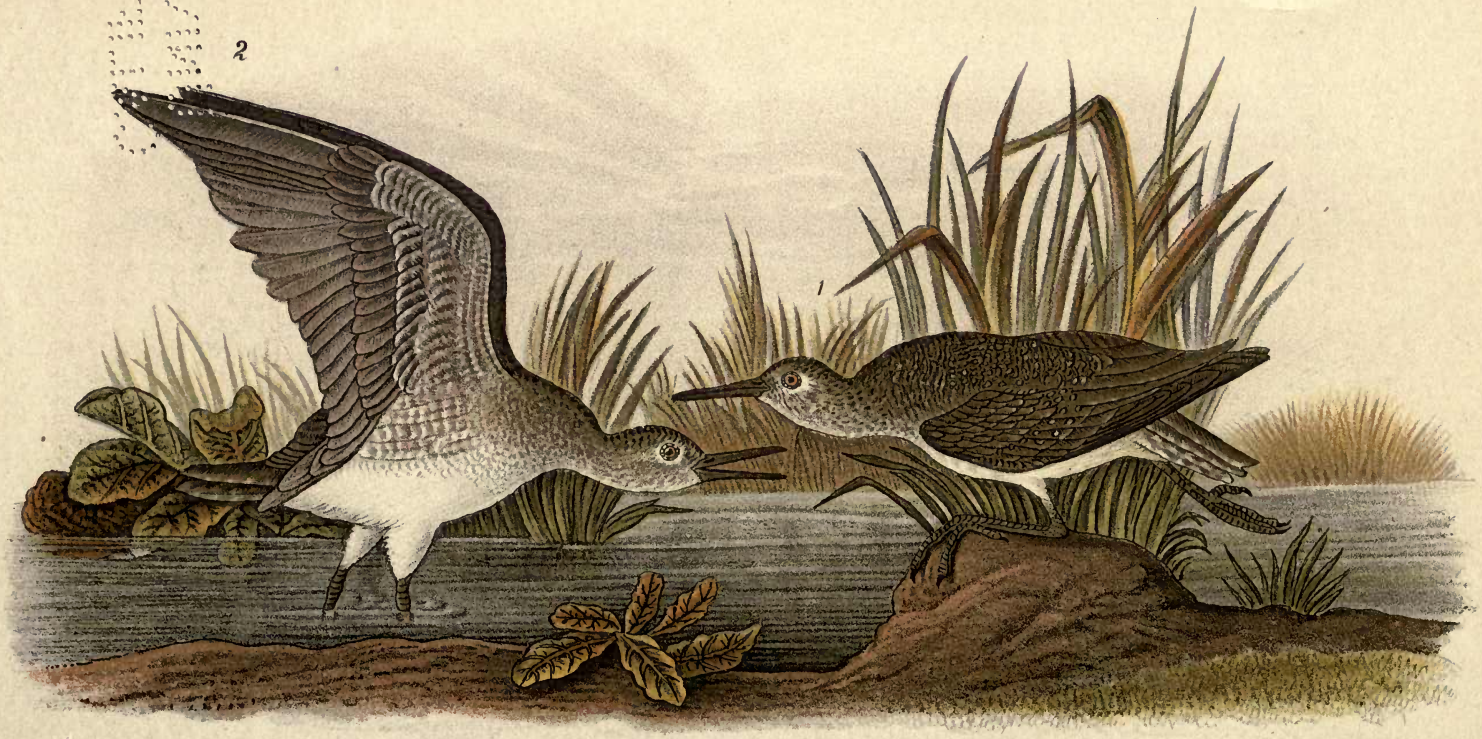
Glaucionetta clangula americana (Bonap.).

American Golden-eye; Whistler.

Description (*Plate 59*).

Bill considerably shorter than head, and very high at base; frontal feathers extend beyond those on sides; tail of sixteen feathers and rather pointed.

Male.—Head and upper part of the short neck glossy-green, and a rounded patch of white along base of bill in front of eye (in a young male before me the head is



Solitary Sandpiper.

1. Male; 2. Female.

blackish, with slight greenish gloss on sides and the white loral patches are mottled with dusky); bill (dried skin) black; legs yellowish; iris orange-yellow; lower neck under plumage generally, and middle and greater wing coverts, sides, inner secondaries, some of the scapular and tertial feathers white; back, primaries inner scapulars and tertials black. Female has snuff-brown head, and no white loral spots—usually less white on wings. Length about 20 inches; extent about 31 inches.

Habitat.—North America, breeding from Maine and the British Provinces northward; in winter south to Cuba.

This handsome bird, called, usually by sportsmen, Whistler, from the fact that when flying its wings make a loud whistling sound, is a regular and rather common spring and fall migrant, and in winter it is often seen about our large rivers and on Lake Erie. The Golden-eye, generally shy and very difficult to approach, is an expert diver, and a particularly rapid flyer. Feeding as it does, principally, on fish, cray-fish, bivalves, etc., its flesh is usually fishy and very unpalatable.

Genus **CHARITONETTA** Stejneger.

Charitonetta albeola (Linn.).

Buffle-head.

Description (*Plate 60*).

Bill much shorter than head. Feathers of hind head and upper part of short neck long and puffy (especially in male).

Male.—Broad white patch on side of head back of eyes meeting its fellow behind; rest of head and upper neck dark, with beautiful iridescent purple, green and violet hues; ring around lower part of neck, sides and under plumage (lower part of abdomen is grayish) wing coverts, except the lesser and many of the secondaries, white, and back black; upper tail coverts grayish-white; upper surface of primaries glossy-black; lining of wings brownish and white; bill (dried skin) dull blue, legs brownish-yellow; eyes brown. Length about 15 inches; extent about 24 inches. Female is smaller than male and feathers of sides and back of head shorter, and has head, neck and upper parts generally dark grayish-brown, with slight trace of white patches on sides of head, back of, but not reaching to eyes.

Habitat.—North America; south in winter to Cuba and Mexico. Breeds from Maine northward; through the fur countries and Alaska.

This beautiful little duck, commonly called Butter-ball, is frequently met with during migrations about our rivers and mill-ponds. The species is, however, much more common in autumn than during the winter and spring. The Buffle-head, like the Grebe and Loon, will dive at the flash of a gun and swim, it is said, under the water with only its bill above the surface. Audubon says: "Their food is much varied, according to situation. On the sea-coast, or in estauries, they dive after shrimps, small fry and bivalve shells, and in fresh water they feed on small cray-fish, leeches and snails, and even grasses." In the stomachs of five of these ducks, which I have examined, were found small shells and coleopterous insects.

Genus **CLANGULA** Leach.

Clangula hyemalis (Linn.).

Old-squaw; Long-tailed Duck.

Description (*Plate 62*).

Bill smaller and much shorter than head; tail of 14 pointed feathers.

Male in winter.—Bill black, yellowish towards end; iris red; legs light lead color; head, neck and fore part of back white or whitish; lores and cheeks gray, and a blackish oblong space below ears on sides of neck; lower part of back, upper tail coverts, breast, upper part of belly and four long middle tail feathers, black; posterior part of belly white; wings brownish.

Female.—Head, neck and lower parts mainly white; top of head, sides of same and chin brownish-black; throat streaked with dusky; upper parts blackish-brown, darker on lower back. Length of male (depends on development of four central tail feathers) about 23 inches. Length of female about 18 inches; extent about 28 inches.

Habitat.—Northern hemisphere; in North America south to the Potomac and the Ohio; breeds far northward.

Regular spring and fall migrant on our principal rivers, and at Erie bay, but seldom seen about the smaller streams and ponds in the state. This species, in winter, is frequently found on the Susquehanna from Harrisburg southward. Prof. August Kock says the Old-squaw is a very plentiful visitor in April on the Susquehanna river in Lycoming county. The flesh of the Long-tailed Duck is quite tough, dark-colored and fishy. The stomachs of five of these ducks, shot last winter near Harrisburg, contained fish, mussels, beetles and sand.

Genus **SOMATERIA** Leach.

Somateria spectabilis (Linn.).

King Eider.

Description.

Bill high at base, shorter than head; frontal feathers and those of chin extend far forward.

Male in winter.—Bill (dried skin) brownish-yellow, darker toward end; legs brownish; eyes dark-brown; head reddish-brown, darkest on top, brightest on sides, and faintly spotted with dusky; throat and most of neck blackish; jugulum dirty yellowish-white with dusky spots; sides mostly dull black; breast and under parts generally grayish-brown; upper parts dark brownish; feathers of fore-back, scapulars, wing coverts and about root of tail, edged with rusty and gray. The female in winter is very similar to male, as described above, except she has less black, especially on neck which is dark reddish-brown, very much same as the sides of head of male.

Habitat.—Northern parts of northern hemisphere; breeding in the Arctic regions; in North America south casually in winter to New Jersey and the Great Lakes.

Accidental winter visitor at Erie bay, where, on the 30th of November, 1889, a flock of probably eighteen or twenty individuals made their ap-

pearance a few hours after a severe storm, which lasted for two days, had visited the region of the Great Lakes. About fourteen of these ducks, which the hunters called "boobies"—a name that is also given by them to the surf ducks which freqently visit the bay—were shot by three or four gunners, who had no trouble in approaching within a few yards of the stupid ducks which were found swimming close to the dock where a large number of men were engaged in unloading iron ore from vessels.

Through the kindness of Mr. James Thompson, of Erie, Mr. Geo. B. Sennett and I secured, from gunners, seven of these birds, six immature males (all of which varied greatly in plumage) and one female. Two hunters, who unfortunately before they knew we were anxious to preserve the ducks for our collections, had cooked three or four which they had captured, said the dark-colored flesh was tough, stringy and so rank and unsavory that they could not eat it. The oldest hunters assured us they had never before seen ducks of this kind in that locality.

NOTE.—A duck supposed to be the American Eider (*Somateria dresseri*) was captured in the winter of 1886, near Chadd's Ford, Delaware county, but as the bird was not positively identified, I have not included it among the birds of our state.

GENUS **OIDEMIA** FLEMING.

Oidemia americana SW. & RICH.

American Scoter; Booby; Sea Coot.

DESCRIPTION.

Bill high at base and swollen.

Adult Male.—Bill (dried skin) base of upper mandible reddish-yellow, rest blackish; iris brown; tarsi blackish; entire plumage black, the neck and back with slight gloss. Female sooty-brown; throat and sides of head whitish, lower plumage is lighter than that of upper parts; belly grayish-white; bill blackish and smaller than that of male. A male measures 19½ inches long and 35 inches from tip to tip; female smaller.

Habitat.—Coasts and larger lakes of northern North America; breeds in Labrador and the northern interior; south in winter to New Jersey, the Great Lakes and California.

Rather rare migrant in spring and autumn, and occasional winter visitor on Susquehanna and Delaware rivers. At Erie bay this species is said to be of very rare occurrence.

Oidemia deglandi BONAP.

White-winged Scoter; Booby.

DESCRIPTION.

Male.—Bill much swollen and high at base; feathers extend on sides near nostrils; bill quite broad, black at base and on edges; rest red; eyes yellow; legs red-

dish-yellow. General plumage black, a white streak about one inch long runs under and behind eye; secondaries and tips of greater coverts form a white speculum.

Female.—Bill blackish and less swollen than in male; general plumage similar to male but paler; speculum white; whitish patch on side of head. Length about 22 inches; extent about 38 inches; female smaller.

Habitat.—Northern North America, breeding in Labrador and the fur countries; south in winter to the Middle States, southern Illinois and southern California.

Spring and fall migrant and winter visitor on our principal rivers and at Erie bay. At the last mentioned locality this species is sometimes seen, particularly in the late fall or early winter, in good-sized flocks. On the Susquehanna river it is usually found singly or in pairs.

Oidemia perspicillata (Linn.).

Surf Scoter; Surf Duck; Booby; Sea Coot.

Description.

Male.—Upper mandible much swollen and frontal feathers extend far forward; maxilla swollen at sides and wider at upper part of base than below; general color black; a triangular white patch on top of head, beginning at about middle of eyes and narrowing as it extends over forehead; a second white triangular patch, widest above on nape and extending down on back of neck; bill (dried skin) pale-yellowish and red, with large rounded black spots on side; legs red; iris yellowish. Female has a blackish bill which is not swollen at base; general plumage sooty-brown; lower parts grayish; sides of head whitish, in some individuals a whitish loral patch; forehead and hind neck brownish black. Length of male about 20 inches; extent about 33.

Habitat.—Coasts and larger inland waters of northern North America; in winter south to the Carolinas, the Ohio river and Lower California.

Rather rare spring and fall migrant and winter resident. When found with us this duck inhabits the same localities as the two previously described species. In January, 1890, I purchased from a hunter at Erie, one of these Scoters, which he had shot on the bay, where he said a flock of about twenty had been seen.

Genus ERISMATURA Bonaparte.

Erismatura rubida (Wils.).

Ruddy Duck; Spine-tailed Duck.

Description (*Plate 63*).

Bill bent upwards and about as long as head, very broad; nostrils small and situated near culmen; head small; neck thick; tail consists of eighteen stiff and narrow feathers; the under surface of shafts of tail feathers channelled; tail coverts very short.

Male.—Bill bluish; legs grayish-blue; iris reddish-brown; top of head and nape blackish; upper plumage, greater part of neck rusty-brown, brightest on back; sides of head and chin white; lower parts whitish, breast sometimes very rusty.

Female and young male.—Top of head and upper parts generally brownish, dotted with grayish and reddish-brown; sides of head grayish-white and rusty lower parts grayish-white. A small duck about 15 inches long and 22 inches in extent.

Habitat.—North America in general, south to Cuba, Guatemala and northern South America, breeding throughout most of its North American range.

Winter resident found generally throughout the state. Arrives in October and remains until late in April; in summer, occasionally, stragglers of this species are observed at Erie bay, but I am not aware that they ever breed there or in any other part of Pennsylvania. Although the Spine-tailed Ducks are found here in winter, they are much more numerous during the spring and fall migrations than in winter. The Ruddy Duck varies greatly in its plumage, but can easily be recognized by its long stiff tail which, when swimming, is carried high up. Like the Grebe, this duck is an expert diver. Its food consists chiefly of vegetable substances—seeds, roots and stems of grasses and other aquatic plants.

SUBFAMILY **ANSERINÆ**. GEESE.

THE GEESE.

But one representative of this subfamily—the common Wild Goose (*B. canadensis*)—is found as a regular and common migrant in our state.

GENUS **CHEN** BOIE.

Chen cærulescens (LINN.).

Blue Snow Goose.

DESCRIPTION.

"Bill and feet flesh-pink, former with the recess between the mandibles black, the nails whitish; iris dark brown; claws dusky. Head and neck above white, the neck below, passing on to the back and breast, dusky-gray, then fading into whitish on the under parts, changing on the wings into fine bluish-gray, or silvery ash; rump and upper tail coverts whitish; quills and tail feathers dusky, edged with whitish, primaries black. Size of the Snow Goose (*Chen hyperborea nivalis*), or rather less, and closely resembling the young of that species. Length about 25; wing 16; bill 2.25; tarsus 3.

Habitat.—North America at large" (but chiefly in the interior).—*Coue's Key to N. A. Birds.*

The Blue Snow Goose, called also the Blue Goose, is placed in the "Hypothetical List" of the A. O. U. Check List, but Prof. Robert Ridgway (*Manual of N. A. Birds*) states that it is beyond question a good species. I have never seen the Blue Goose in Pennsylvania, but give it a place in this report on the authority of Dr. T. Z. Hazzard, residing at Allegheny City, Pa., who writes me that he saw one which was shot on the Ohio river, near Pittsburgh, in the fall of 1887. This bird was seen in company with other wild fowl. The Doctor further adds it is very rare here even as a migrant.

Chen hyperborea nivalis (FORST.).

Greater Snow Goose.

DESCRIPTION.

"Bill carmine-red or pale purplish with a salmon tinge, the nails white, the recess between mandibles black. Eyes dark brown. Feet dull lake-red, the claws black-

ish. Adult plumage pure white, the head usually washed with rusty-brown, like a swan's, the ends of the primaries blackening. Young resembling the last, but the head not white, while other parts are colored. Large: length, 27.00—31.00; extent, 57.00—62.00; * * * weight 5 or 6 pounds."—*Coue's Key N. A. B.*

Habitat.—North America, breeding far north, and migrating south in winter, chiefly along the Atlantic coast, reaching Cuba.

Rare and irregular visitor in the early spring, late fall, and in winter. Specimens have been taken in Pennsylvania by Dr. John W. Detwiller of Bethlehem, Pa., and Prof. H. Justin Roddy of Millersville, Pa.

Genus **BRANTA** Scopoli.

Branta canadensis (Linn.).

Canada Goose.

Description (*Plate 64*).

"Tail of eighteen feathers; head, neck, bill and feet, deep-black; a large triangular patch of white on the cheeks behind the eye; the two of opposite sides broadly confluent beneath, but not extending to the rami of lower jaw; a few whitish feathers on lower eyelid; upper parts brown, edged with paler; under parts light, with a tinge of purple-gray, sometimes a shade of smoky brown; the edges of the feathers paler; the color of the body of the feathers, though similar, becoming deeper on the sides, tibia, axillars, and inside of wings; the gray of the belly passes gradually into white on the anal region and under coverts; the upper tail coverts are pure-white; the primary quills and rump are very dark blackish-brown; the tail feathers are black; iris brown.

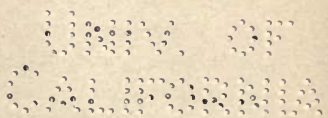
"Length, 35 inches; wing, 18; tarsus, 3.10; commissure, 2.10 inches."—*Baird's Birds of N. A.*

Habitat.—Temperate North America, breeding in the northern United States and British Provinces; south in winter to Mexico.

This well-known bird, usually called Wild Goose, is a common spring and fall migrant in Pennsylvania.

In referring to this species, Wilson says: "The flight of the Wild Geese is heavy and laborious, generally in a straight line, or in two lines, approximating to a point thus, >: In both cases the van is led by an old gander, who, every now and then, pipes his well known *honk*, as if to ask how they come on; and the honk of 'All's well' is generally returned by some of the party. Their course is in a straight line, with the exception of the undulations of their flight. When bewildered in foggy weather, they appear sometimes to be in great distress, flying about in an irregular manner, and for a considerable time over the same quarter, making a great clamor. On these occasions, should they approach the earth and alight—which they sometimes do to rest and recollect themselves—the only hospitality they meet with is death and destruction from a whole neighborhood already in arms for their ruin."

The food of this species consists chiefly of vegetable materials, such as cereals, the seeds, roots and other portions of plants.



Killdeer.

1. Male; 2. Female.

Branta bernicla (LINN.).

Brant.

DESCRIPTION.

Bill rather small and short. Bill and legs black; iris brown. Head, neck, body in front of wings, primaries and tail black; a small white patch on each side of neck streaked with black; few white feathers on chin and about lower eyelids; back brownish-gray, lower parts quite similar but lighter; rump darker than upper part of back; feathers about tail mostly white. Length about 23 inches; extent about 46 inches.

Habitat.—Northern parts of the Northern Hemisphere; in North America chiefly on the Atlantic coast; rare in the interior, or away from salt water.

The Brant, or Brant Goose, as this species is usually called by sportsmen, is found in Pennsylvania only as a very rare and irregular visitor, about our large rivers. In January, 1890, I purchased one of these birds from a gunner who had shot it on the Susquehanna river near Harrisburg, Pa. Mr. D. Frank Keller of Reading, Pa., has a specimen which was captured in Berks county; and Dr. G. A. Scroggs, of Beaver, Pa., informs me Brant geese are occasionally found on the Ohio river, in Beaver county. The Brant feeds almost exclusively on a vegetable diet.

SUBFAMILY **CYGNINÆ**. SWANS.

GENUS **OLOR** WAGLER.

Olor columbianus (ORD.).

Whistling Swan.

DESCRIPTION.

Neck longer than body. Length about 4½ feet; extent about 7 feet; bill has yellowish spot in front of eye, rest of bill, also legs and feet black; eyes brown. Plumage of adult is pure white, with the head, neck and belly in some individuals tinged with rusty. The young are said to be a light lead color, with head and neck tinged with yellowish-brown; and the color of legs, bill and feet is described as being much paler.

Habitat.—Whole of North America, breeding far north.

Spring and fall migrant, also occasional winter visitant. This species is more frequently seen on Lake Erie and about our principal rivers than elsewhere, though it occurs generally throughout the state. The following interesting account * of an unusual flight of these swans, is from the pen of my friend, Mr. Geo. B. Sennett, of Erie city, Pa.:

"An unusual flight of swans occurred in northwestern Pennsylvania on the 22d of last March (1879). Crawford, Mercer, Venango and Warren counties being the places where they were seen. On the day mentioned, as well as the previous day and night, a severe storm prevailed, the rain and snow freezing as they fell. The swans, on their migration north, were caught in the storm, and becoming overweighted

* Bulletin Nutt. Club, Vol. V, pp. 125, 126.

with ice soon grew so exhausted that they settled into the nearest ponds and streams almost helpless. Generally a single one was seen in some mill-pond or creek, and the fowling-piece loaded with large shot, and not unfrequently the rifle, was used to bring to bag the noble game, though, considering the plight they were in, in all probability any one might have paddled up to the birds and taken them alive. In fact in a number of instances they were reported as thus taken alive. Large flocks were seen in some districts in the same pitiable condition. In close vicinity of Meadville only two, I believe, were taken. Titusville and Oil City and the intervening eighteen miles up Oil creek and its branches seem to have been the points where they were seen in greatest number. A published report from the former place states that 'ten or twelve White Swans were captured alive' near East Titusville. The report from the Rouseville (three miles above Oil City, on Cherry run) correspondent of the *Oil City Derrick* states: 'A flock of from thirty-three to thirty-five American or Whistling Swans surprised the inhabitants of Plumer on Saturday forenoon by alighting in the waters of Cherry run. One of the swans was almost immediately shot at and killed, and, to the surprise of the now large crowd of men and boys, the remainder of the flock, on account of the ice accumulating on their wings, was unable to fly, and a general rush was then made for the poor birds, and twenty-five were captured alive by the eager fellows. Some have them yet alive, but many were killed for their feathers and flesh. The remaining eight or ten birds finally managed with great difficulty to arise. One, however, soon alighting in the midst of Rouseville village in Cherry run, was soon killed by Dave Phillips, the balance flying a little further, alighting in Oil creek. A general stampede of men and boys now took place, the greater part armed with some weapon of warfare; but Charley Clark, a noted sportsman and accurate shot, led the van, and was successful in laying over two of the splendid birds, and badly wounding a third, at the first shot. He afterward shot the third and fourth, and the vociferous crowd returned to town, four men bearing the burdens of the victor's spoils. The larger of the birds shot by Clark was a magnificent creature, measuring fifty-one inches from tip of bill to tail, and eighty-six inches in extent, and weighing over sixteen pounds; it is said that the one shot by Phillips was larger, weighing twenty pounds."

ORDER HERODIONES. HERONS, IBISES, ETC.

SUBORDER CICONIÆ. STORKS, ETC.

FAMILY CICONIIDÆ. WOOD IBISES, ETC.

SUBFAMILY TANTALINÆ. WOOD IBISES.

GENUS TANTALUS LINNÆUS.

Tantalus loculator LINN.

Wood Ibis.

DESCRIPTION.

Size large, with long legs, neck and beak, the latter measuring in specimen before me 8½ inches; bill high and wide at base, tapering to the end which curves downward; tibiæ bare for more than half their length. Sexes alike in plumage.

Male.—Bill (dried skin) both mandibles about base blackish; most of lower mandible, sides of maxilla in front of nostrils and culmen, of brownish-yellow; lightest on upper surface; bare skin of head and upper part of neck dull bluish-black, thickly covered, especially on nape and back of neck, with grayish-brown scales; tail and long wing feathers black, with green, purplish and bronze reflections. Rest of plumage pure white; legs (dried skin) brownish-black; toes yellowish; iris dark-brown. Length about 4 feet; extent about 5¼ feet. Weight 9 to 12 pounds.

Habitat.—Southern United States, from the Ohio Valley, Colorado, Utah, California, etc., south to Buenos Ayres; casually northward to Pennsylvania and New York.

The Wood Ibis, a common resident in the southern states, occurs in Pennsylvania as a very rare and irregular visitor. The late Judge Libbart, in his ornithological report of Lancaster county, says: "I obtained a fine specimen of this species, shot from a troop of ten by Mr. M. Ely on the Susquehanna, July, 1862."

Mr. C. J. Pennock, in his catalogue of Chester county birds, writes that a Wood Ibis was taken a number of years ago by the late Vincent Barnard. Prof. August Kock, of Williamsport, has one in his collection which was captured a few years ago in Lycoming county, and Dr. Walter Van Fleet, of Renovo, includes it among the stragglers in his list of species found in Clinton county. Dr. A. C. Treichler, Elizabethtown, has specimens of this bird in his collection which were shot in Lancaster county in the early part of July, 1883, shortly after severe storms. Mr. Geo. P. Friant, of Scranton, informs me that a small flock of Wood Ibises, about four or five years ago, were seen in his neighborhood.

In Florida, where these birds were very common in 1885, I found they fed chiefly on fish, frogs and snakes.

NOTE.—Dr. Turnbull (*Birds of Eastern Pennsylvania*) writing of the Glossy Ibis (*Plegadis autumnalis*)—family *Ibididæ*, says: "Last season (1866) Mr. John Krider shot a specimen just below Philadelphia. At long intervals it has been seen on the river Delaware." I have in my

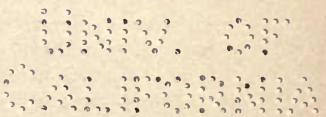
possession a specimen of the White Ibis (*Guara alba*)—family *Ibididæ*, which is said to have been captured in Pennsylvania about thirty years ago. In the museum at Lancaster city, there is a specimen of the Roseate Spoonbill (*Ajaja ajaja*)— family *Plataleidæ*, which it is stated was captured over twenty-five years ago in Lancaster county. As none of these three species have, so far as I can learn, been observed in Pennsylvania during the past quarter of a century, I do not consider that any of them are entitled to a place in this report.

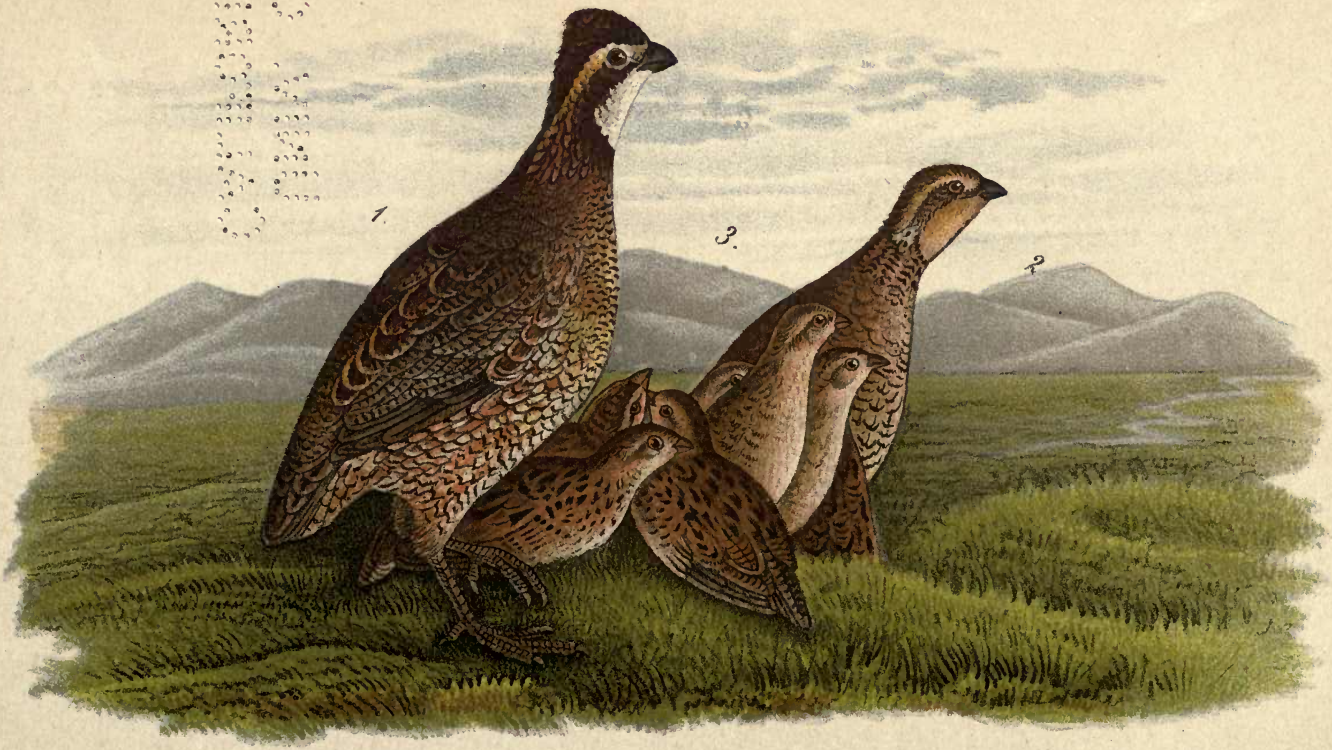
SUBORDER HERODII. HERONS, EGRETS, BITTERNS, ETC.

FAMILY **ARDEIDÆ.** HERONS, BITTERNS, EGRETS.

THE HERONS, ETC.

Birds of this family—containing, it is said, about seventy-five species—are very generally dispersed throughout all parts of the globe. A few species wander to cold countries, but the great majority of these waders inhabit the lower temperate and tropical regions. In different localities throughout the United States, about fifteen species and varieties (local or geographical races) are recorded by modern writers; of these nine species have been taken, during recent years, in Pennsylvania. Some species occur with us as regular summer residents, while others are observed here only as transitory visitors in the spring and fall migrations. These birds frequent muddy banks of rivers, creeks, lakes and ponds; they are also found about swampy meadows and marshy places, particularly if the latter are well supplied with pools of shallow water, protected by trees or bushes. They often remain quiet or inactive in daytime, but as evening approaches, or in the night, they go out, like the owls, in quest of food, which is secured by rapid, dexterous thrusts of their long, spear-like bills. Birds of this group subsist chiefly on various kinds of fishes (fish measuring nearly a foot in length are often swallowed by large herons), frogs and snakes; and they also eat other kinds of animal food, such as large insects, field-mice, lizards, cray-fish, leeches, etc., and some of the larger herons occasionally catch wood-rats, and young birds of other species which breed about their favorite feeding resorts. With the exception of the Bitterns, these birds are gregarious, particularly when breeding, and in the southern states where herons and egrets are abundant, they often breed together in great numbers, frequently in company with cormorants, water turkeys and ibises. The herons and egrets build rude and bulky nests of sticks and twigs, in trees or bushes; the bluish or greenish colored and unspotted eggs vary from two to six in number. The sharp, rasping cries of these birds, are often uttered when feeding, also if they are frightened, and frequently when flying, either when migrating or when going to and from their feeding places. Birds of this family are known by the following characters: Long neck and legs; bill long, straight, tapering, acute and furnished with sharp cutting edges. Lores naked and usually, particularly in the breeding season, bright colored; the head is rather long, narrow and flat on the sides. When breeding these birds frequently have back of head, the lower neck, back or scapulars, beautifully ornamented with long plumes. Herons and egrets have three pairs of powder-down tracts, one on lower part of back, the second on lower belly, and a third on breast. Bitterns have two pairs of these tracts, one on lower back, the other on breast; toes long and slender; the claws are long and curved, especially that of hind toe, and the middle claw has a fine comb on inner edge. The hind toe is inserted on a level with three in front; outer toes usually connected with middle by a small web at base, others free. Tail very short, twelve feathers, except in bitterns, which have only ten.





Bob-white; Quail.

1. Male; 2. Female; 3. Young.

SUBFAMILY **BOTAURINÆ.** BITTERNS.

GENUS **BOTAURUS** HERMANN.

Botaurus lentiginosus (MONTAG.).

American Bittern; Indian Hen.

DESCRIPTION (*Plate 5*).

Adult.—Bill yellowish, dusky on ridge, lores greenish yellow; legs and feet yellowish-green; iris yellow. Length, about 26 inches; extent, about 45 inches. General color brownish-yellow, top of head dull brown, upper parts finely freckled and variegated with different shades of brown, blackish and whitish; chin and throat white with brown streak; a broad and glossy-black stripe about three inches long on upper part of neck.

Habitat.—Temperate North America, south to Guatemala and the West Indies.

The Bittern or "Green-legged Crane," as this wader is called by many sportsmen, is readily distinguished from other birds of the family by its brownish-yellow plumage, greenish-colored legs, and large size. It is a summer resident in Pennsylvania, where it arrives generally early in April and remains until about the first week in November. Although these birds breed, occasionally at least, in different parts of the state, they are much more frequently met with (singly or in pairs) when migrating in the spring and fall, than in summer. In this locality these birds are never found in flocks; commonly only solitary individuals are seen frequenting chiefly the thick swampy districts about meadows and rivers. During the daylight Bitterns conceal themselves in the long grasses, weeds, bushes, etc., growing about swamps. They migrate and feed during the night.

Mr. George B. Sennett, Erie, Pa., says, he is quite certain this species breeds occasionally on the peninsula, near Erie city; also at Conneaut Lake, Lake Pleasant and Oil Creek Lake, in Crawford county. Mr. W. H. Buller, residing at Marietta, Lancaster county, Pa., in a letter dated July 29, 1889, addressed to me, writes as follows: "I am inclined to believe that the American Bittern breeds in the vicinity of Schock's Mills, a few miles west of Marietta. While I have never found its nest or seen its young, yet I have so frequently seen the bird in that vicinity during the summer that I think it probable that it breeds in the swamps there." Dr. George R. Ross, of Lebanon, Pa., states that it breeds in Lebanon county. In Perry county, Mr. H. Justin Roddy, Millersville, Pa., has observed it as a "rare breeder." Mr. J. F. Kocher, of South Whitehall, Pa., says the Bittern is occasionally found breeding in Lehigh county, and Dr. Walter Van Fleet of Renovo, Pa., mentions it as breeding occasionally and sparingly in Clinton county.

The nest of this bird is placed on the ground; the eggs, three to five in number—three is said to be the usual number—are described as brownish-drab, unspotted, measuring about 2 inches long by about 1½ inches broad.

According to Dr. Coues, "the food of this bird consists of various kinds of small aquatic animals. In its stomach may be found different molluscs, craw-fish, frogs, lizards, small snakes and fishes, as well as insects. Such prey is captured with great address, by spearing, as the bird walks or wades stealthily along. The thrust of the bill is marvelously quick and skilful—more action is displayed on such occasions than probably under any other circumstance."—*Birds of the Northwest.*

Although Bitterns frequently devour fish, I believe they prefer other kinds of animal food, especially snakes, frogs and insects.

The food materials of nine of these birds, which I have examined, are given in the following table:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	April 11, 1880, . . .	Chester county, Pa., . . .	Beetles and scales of fish.
2	April 23, 1880, . . .	Chester county, Pa., . . .	Water-snake.
3	April 29, 1881, . . .	Delaware county, Pa., . . .	Cray-fish and frogs.
4	Sept. —, 1881, . . .	Chester county, Pa., . . .	Beetles and frogs.
5	April —, 1882, . . .	Chester county, Pa., . . .	Two snakes, each about eighteen inches in length.
6	April —, 1882, . . .	Chester county, Pa., . . .	Snake and snails.
7	Oct. 3, 1883, . . .	Philadelphia Market, Pa.,	Grasshoppers and beetles.
8	April —, 1895, . . .	Orange county, Fla., . . .	Numerous insects.
9	April —, 1885, . . .	Orange county, Fla., . . .	Cray-fish and remains of fishes.

Botaurus exilis (GMEL.).

Least Bittern.

DESCRIPTION.

"Head above and the back dark glossy-green; upper part of neck, shoulders, greater coverts, and outer webs of some tertials, purplish-cinnamon; a brownish-yellow scapular stripe (broadest in female).

Female with the green of head and back replaced by purplish-chestnut. Iris yellow.

Length, 13 inches; extent, about 17; wing, 4.75; tarsus, 1.60; bill above, 1.75."—*Bairds' B. of N. A.*

Habitat.—Temperate North America, from British Provinces to the West Indies and Brazil.

The Least Bittern, the smallest of the herons, I have found in this state only as a rather rare visitant during the spring and fall migrations. This species is sometimes, though rarely, observed in Pennsylvania during the breeding season. When alarmed they fly generally but a few yards and take shelter among the reeds or long grass. Least Bitterns are scarcely ever seen exposed, but skulk during the day, and, like the preceding species, feed chiefly in the night.

Mr. Geo. B. Sennett, of Erie, has taken specimens in Crawford and Erie counties, where it is said the species breeds occasionally. Dr. John W. Detwiller, of Bethlehem, Pa., has found the Least and also the American Bitterns breeding here. From personal observation I know nothing concerning the nest or eggs of this species. The following interesting remarks relating to nest and eggs of this bird are taken from Oliver Davie's valuable work (*Nests and Eggs of North American*

Marsh Hawk.

1. Male; 2. Female.

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Birds): "In some places as many as a dozen or twenty pairs breed along the grassy shores of a small lake or pond. Like the last, it inhabits reedy swamps and marshes where the quagmire abounds with a luxuriant growth of rushes, which is also the home of the rails. The nest is placed on the ground or in the midst of the rankest grass, or in a bush. It is often placed on floating bog, and is simply a platform of dead rushes. The bird has many odd habits. When standing on the edge of a stream, with its neck drawn in, it is often taken for a woodcock, the long bill giving it this appearance. It appears so stupid at times that it may be caught with the hand. The bird is mostly seen just before or after sunset. In many of the southern states this species rears two broods in a season, fresh eggs having been obtained in May and August. In Texas, Mr. Rachford says, it nests along the edges of the water courses in May, bending down the tops of water grass and platting it into a snug little nest, about two or three feet above the water. * * * * The eggs of the Least Bittern are from three to five, usually four, in number, pale bluish or greenish-white, elliptical in shape. The average size is 1.20 by .93."

According to Nuttall, this species subsists chiefly on small fish and aquatic insects. Audubon states that "the food of this bird consists of snails, slugs, tadpoles, or young frogs and water-lizards. In several instances, however, I have found small shrews and field-mice in their stomachs." The food materials of six of these birds examined by me are given, with date of collection, and locality where taken, in the following table:

No.	Date.	Locality.	Food-Materials.
1	April 29, 1879.	Lancaster county, Pa.	Hair of small mammal.
2	Sept. —, 1880.	Delaware county, Pa.	Beetles.
3	Sept. —, 1880.	Delaware county, Pa.	Insects and remains of fish.
4	Sept. 20, 1881.	Philadelphia Market, Pa.	Portion of a small snake and insects.
5	Aug. 25, 1883.	Delaware county, Pa.	Beetles and "worms."
6	May 20, 1884.	Chester county, Pa.	Vegetable-matter.

Subfamily **ARDEINÆ**. Herons and Egrets.

Genus **ARDEA** Linnæus.

Ardea herodias Linn.

Great Blue Heron; "Big Crane."

Description (*Plate 69*).

Adult.—Bill about six inches long, chiefly yellow, dusky on culmen; eyes yellow; legs and feet blackish, yellowish about toes; lores greenish-yellow or bluish. The color of bill, legs and lores vary greatly not only with age and season but also with individuals. The male, larger than female, is about 4 feet long and about six feet from tip to tip. Forehead and central portion of crown white, surrounded on sides and behind with black; long occipital feathers black; neck chiefly brownish-gray: feathers on middle (in front) of lower two-thirds of neck, with a showy streak of

black, white and rusty; chin and upper part of neck in front white. Tibiæ and edge of wing reddish-brown; upper parts and tail light bluish-slate color; long scapular feathers and long loose feathers on lower neck; crissum white; under parts chiefly black, streaked with white. The young are different in many respects from the above, but can always be known by their large size and a general resemblance to the adult.

Habitat.—North America, from the Arctic regions southward to the West Indies and northern South America.

This bird, the largest of our herons, is a summer resident in various localities in this state. During the last few years, however, several favorite breeding resorts in eastern Pennsylvania, which were annually visited by this and other species, have been broken up by boys and men who destroyed the birds, old and young, simply because their feathers would bring a few dollars, and, as they remarked, "*there's no law to stop it.*"

I have no doubt that the time will soon come when this beautiful heron will be known in this commonwealth only as a rare straggling visitant. The nest is made of large sticks and twigs, and placed on the larger limbs of trees, generally near the water. The eggs vary in number from three to five, are light-blue in color, and about the size of those of our common domestic fowl. This bird, and the same is true of other herons, when wounded and unable to escape, is one which cannot be handled with too much caution, as it frequently, with its sharp and powerful bill, inflicts severe, dangerous, and, it is said, sometimes fatal wounds. In Florida I met a hunter who had an eye destroyed by one of these birds which he had winged and carelessly attempted to pick up. By some, particularly residents of certain of the southern states, the flesh of the Great Blue Heron is considered quite a delicious morsel. Some few winters ago, when camping in the cypress swamps of Florida, I, more from necessity than choice, eat the breast meat of this heron and also that of the Water Turkey (*Anhinga anhinga*), a bird which preys exclusively on fish, and although I did not especially relish the dish, I must admit that to a hungry man it was in no way disagreeable.

The following interesting observations on the food-habits are given by Nuttall: "Fish is the principal food of the Great Heron, and for this purpose, like an experienced angler, he often waits for that condition of the tide which best suits his experience and instinct. At such times they are seen slowly sailing out from their inland breeding haunts, during the most silent and cool period of the summer's day, selecting usually such shallow inlets as the ebbing tide leaves bare or accessible to his watchful and patient mode of prowling; here wading to the knees he stands motionless amidst the timorous fry, till some victim coming within the compass of his wily range is as instantly seized by the powerful bill of the heron. * * * If large the fish is beaten to death, and commonly swallowed with the head descending, as if to avoid any obstacle arising from the reversion of the fins or any hard external

processes. On land our heron has also his fare, as he is no less a successful angler than a mouser, and renders an important service to the farmer in the destruction he makes among most of the reptiles and meadow shrews. Grasshoppers, other large insects, and particularly dragon-flies, he is very expert in striking, and occasionally feeds upon the seeds of pond lilies, contiguous to his usual haunts. Our species, in all probability, as well as the European Heron, at times preys upon the young birds which may be accidentally straggling near their solitary retreats."

In the months of March and April, 1885, I examined the stomachs of twenty-three of these birds which had been killed by plume-hunters in Orange and Volusia counties, Florida. Twelve birds had fed entirely on fish; three had taken fish and cray-fish; two, small snakes; one, frogs and fish; one, fish and a few feathers; one, traces of beetles, Three birds were destitute of all food materials.

From my investigations made in Florida, as well as the records in the following table, I would say this heron is mainly piscivorous in habit:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	June 3, 1879.	Brigantine, N. J.,	Remains of fish.
2	Aug. 23, 1879.	Chester county, Pa.,	Remains of fish.
3	June 7, 1880.	Delaware county, Pa.,	Remains of fish.
4	June 12, 1880.	Berks county, Pa.,	Remains of fish.
5	May 15, 1880.	Chester county, Pa.,	Remains of fish.
6	Sept. —, 1882.	Brigantine, N. J.,	Remains of fish.
7	Oct. 24, 1883.	Delaware county, Pa.,	Remains of fish.
8	April 20, 1884.	Delaware county, Pa.,	Remains of fish.
9	Aug. —, 1884.	Willistown, Pa.,	Remains of fish.
10	Aug. —, 1884.	Willistown, Pa.,	Remains of fish.

Ardea egretta GMEL.

American Egret; Large White Crane.

DESCRIPTION.

The plumage of this bird is entirely white; in the breeding season the adults have the backs ornamented with long hair-like plumes, frequently so long that they touch the ground when the bird stands erect; legs and feet black; eyes bright yellow; bill yellow, and about five inches long; point of upper mandible black; measures, from tip to tip of wings, about five feet.

Habitat.—Temperate and tropical America, from New Jersey, Minnesota and Oregon south to Patagonia; casually on the Atlantic coast to Nova Scotia.

This beautiful bird, now chiefly found in the southern states, where it is rapidly being exterminated by the heartless and money-loving plume-hunters, is a rather rare and irregular migrant in Pennsylvania. It occurs in this state, generally, only in the late summer and autumn, when straggling individuals are seen in suitable locations, in almost every quarter of the commonwealth. In former years, this species is said to have reared its young in Pennsylvania. The stomach contents of thirteen of these egrets, which I have examined, are here given·

No.	Date.	Locality.	Food-Materials.
1	August, 1879,	Lancaster county, Pa.,	Fishes and insects.
2	July, 1881,	Chester county, Pa.,	Field-mouse and cray-fish.
3	July, 1884,	Delaware county, Pa.,	Fishes and frogs (*Rana*).
4	April, 1885,	Orange county, Fla.,	Cray-fish.
5	April, 1885,	Orange county, Fla.,	Fish-scales and bones.
6	April, 1885,	Orange county, Fla.,	Fishes.
7	April, 1885,	Orange county, Fla.,	Insects.
8	April, 1885,	Orange county, Fla.,	Feathers, apparently of a sparrow (?)
9	April, 1885,	Orange county, Fla.,	Cray-fish and small snake.
10	April, 1885,	Orange county, Fla.,	Fish-scales and bones.
11	April, 1885,	Orange county, Fla.,	Cray-fish and fish-scales.
12	May, 1885,	Volusia county, Fla.,	Stomach empty.
13	May, 1885,	Volusia county, Fla.,	Beetles and dipterous insects.

Ardea candidissima Gmel.

Snowy Heron; Little White Egret.

Description.

Adults in the breeding season have long fine hair-like occipital feathers; the long plumes on back are frequently curved upward at ends, which reach to or a little beyond the ends of tail; plumes on lower neck similar but not curved. Plumage in both sexes, and at all ages, entirely white; bill black, yellow at base; lores, eyes and posterior part of tarsus, yellow, rest of legs black; length about 24 inches; extent about 38 inches. In young birds the occipital feathers are slightly developed, and they also lack the long plumes of back, and jugulum. Old birds when not in breeding dress, have generally at all seasons, the occipital crests well developed, but lack the hair-like plumes on back and lower neck.

Habitat.—Temperate and tropical America, from Long Island and Oregon south to Buenos Ayres; casual on the Atlantic coast to Nova Scotia.

This beautiful heron is most plentiful in the southern states, where it breeds in company with other species. Solitary individuals are sometimes found in this locality during the late summer or early autumn. This egret is much less frequently met with in Pennsylvania than the last. In the counties of Crawford and Erie, Messrs. Geo. B. Sennett, of Erie city, and H. C. Kirkpatrick, of Meadville, have found the Snowy Heron only as a very rare and irregular visitor. Prof. H. Justin Roddy, writing to me July 29, 1887, from Landisburg, Perry county, says, "July 27th I secured here a very fine specimen of the American Egret (*A. egretta*); the first I have ever seen in this county. I have a number of times seen the Snowy Heron (*A. candidissima*) in this locality." Occasional stragglers of this species have been met with in Lehigh and Northampton counties, by Dr. John W. Detwiller, of Bethlehem. Mr. J. F. Kocher, of South Whitehall, Lehigh county; Dr. Geo. R. Ross, of Lebanon, Lebanon county; Dr. Walter Van Fleet, Renovo, Clinton county; Jonas Stern, Kutztown; D. Frank Keller, Reading, Berks county; George Miller and Casper Loucks, York, York county; Dr. A. C. Treichler, Lancaster county; M. J. Webster, Madisonville, Lackawanna county, and Dr. I. F. Everhart, of Scranton, Lackawanna county, all report this heron in their respective counties as a rare and irregular straggler.

Nuttall says: "Its food, as usual, consists of small crabs, worms,

Sharp-shinned Hawk.

1. Male; 2. Female.

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snails, frogs and lizards, to which fare it also adds at times the seeds of the pond lilies and other aquatic plants." In April, 1885, I visited an island in a small lake in Orange county, Florida, where this species, also the Louisiana, Little Blue, and Green Herons, were breeding on low bushes. I shot seven Snowy Herons, and found in the viscera of all only the remains of fish.

Ardea tricolor ruficollis (Gosse.).

Louisiana Heron.

DESCRIPTION.

Adult in breeding season.—Bill four inches or a little more in length, and very slender. Bill (dried skin) bluish-black, and yellowish about base; lores and naked skin around eyes yellowish; eyes reddish-yellow; legs dusky bluish-yellow. The three or four longer occipital plumes, lower part of back, rump, sides, under parts generally, edge of wing, axillars, lining of wings, chin and upper part of throat, white; front and top of head, sides of same, malar region, and most of feathers on sides of long neck, bluish-slate color; upper tail coverts white and bluish; greater part of crest, lower portion and back of neck reddish-purple. Long fine scapular plumes, light brownish gray, quite pale at ends; the white throat is continuous with a reddish-brown streak (brightest on upper third of neck) which narrows and becomes less distinct, as it extends down in front. The young are never white as in *Ardea cœrulea*: they lack the long occipital plumes, also the fine scapular feathers; the head and neck light brownish-red; chin, throat and malar region white; neck in front streaked with white and brownish. Length about 27 inches; extent about 36 inches.

Habitat.—Gulf states, Mexico, Central America and West Indies, casually northward to New Jersey and Indiana.

The Louisiana Heron, more or less abundant in many of the south Atlantic and gulf states, I have never seen in Pennsylvania, where it has been observed only as a rare or accidental visitor in the late summer or autumn.

Stragglers have been seen, at irregular intervals, by the following named gentlemen in their respective localities: Dr. John W. Detwiller, Bethlehem, Northampton county; D. Frank Keller, Reading, Berks county, and Dr. W. Van Fleet, Renovo, Clinton county. This handsome bird, and one which is particularly graceful in its movements, I found breeding in company with other species on low bushes in Florida, in March and April, 1885. Their rather flat nests were made entirely of small sticks. The bluish-green eggs, three to five in number, measure about 1.75 inches long and a little more than 1.25 inches broad. The viscera of eleven of these birds, which were killed at this nesting place, contained fish, frogs and snails.

Ardea cœrulea Linn.

Little Blue Heron; Little White Heron.

Description.*

Bill about three inches long, and quite slender.

Adult (blue phase), breeding plumage.—Bill and lores bluish, former black towards end; the long, narrow and pointed dorsal plumes extend sometimes several inches beyond the tail; legs and feet black; eyes yellow; head and neck "purplish-red or maroon colored," top of head and fine hair-like crest, bluish with purplish reflections; lower part of neck and rest of plumage slate-blue (quite light in some birds and dark in others); some specimens have sooty-black streaks or patches on back and most of belly. In fifteen of these herons I find ten have a blue streak more or less complete extending down front of neck; one has throat bluish and white; theother four have necks without these streaks, and as previously described.

Adult (blue and white or intermediate phase).—Four birds show about the following coloration: Top of head, most of occipital crest, patches on the sides and back of neck, most of the forepart of back (usually rather continuous on back), tips of primaries, some of long neck plumes, also a few of the long dorsal plumes, different shades of bluish; remainder of plumage white; bill chiefly bluish black (one has yellowish streak on maxilla); bluish-yellow about lores and eyes; legs bluish-black; eyes yellowish. One bird has greater part of back, several large wing feathers, and a number of the long dorsal plumes which extend beyond the tail, entirely slaty-blue; primaries faintly tipped with dusky-blue; the top of head and occipital crest, light blue; single maroon feathers, small patches of a like color appear on head and neck.

Adult (white phase).—Two birds: Bill, lores and legs (dried skin) bluish-black; eyes yellow; ends of outer quills bluish; top of head and parts of neck with a faint bluish tint; rest of plumage pure white.

Young.—Bill greenish yellow from base to about half its length; under surface of lower mandible yellowish, rest of both mandibles blackish; lores greenish-blue; eyes yellow; legs greenish or bluish-yellow; ends of several primaries dusky-blue, rest of plumage pure white.

Habitat.—New Jersey, Illinois and Kansas, southward through Central America and the West Indies to Guiana and New Grenada; casually north on Atlantic coast to Massachusetts and Maine.

This little heron is said to be more diurnal in its habits than others of its family. Its food, collected principally in the daytime, according to different writers, consists of fish, frogs, tadpoles, worms, lizards, small crabs and various kinds of insect-life. Thirty-one of these herons, which I obtained in different parts of Florida, in March and April, 1885, were found to have fed almost exclusively on small fishes. Twenty-six of these birds had only the remains of fish in their viscera. Two others had eaten frogs and insects; two, insects only, and the remaining bird had in its stomach two small frogs, a few fish bones and scales, with hair of a small mammal. The nest and eggs of the Little Blue Heron are very similar to those of the Louisiana Heron. This bird, according to my experience, is found in Pennsylvania as a casual visitor in the late summer, or early autumn. During the last ten years I have seen two or three (all young) which were taken in the southeastern part of the

* From twenty-six specimens; one (young) captured August, 1875, in Pennsylvania, the others taken when breeding, in Orange county, Fla., March, 1885.

state. Only five, of over seventy, naturalists and collectors, who have kindly sent me lists of birds found in the different counties of our commonwealth, seems to have observed this species. Their reports are substantially as follows: Dr. John W. Detwiller, Bethlehem, straggler in Northampton county; Dr. W. Van Fleet, Renovo, straggler in Clinton county; D. Frank Keller, Reading, accidental visitor in Berks county. Prof. H. Justin Roddy, in a letter sent to me from Landisburg, July 15, 1889, says: "*Ardea cœrulea* is a rare breeder (Perry county). Found a set of eggs June 20, 1885, near the base of Mt. Dempsey."

Ardea virescens Linn.

Green Heron; Shite-poke; Chalk-line; Fly-up-the-creek.

Description (*Plate 55*).

Length about 18 inches; expanse about 26; bill rather stout, about two and a-half inches long, and about half an inch longer than tarsus.

Adult, in summer.—Top of head, and lengthened crest glossy green; sides of head, and neck, except a whitish and dusky streak in front, bright chestnut or maroon; wing coverts and upper surface of wings and tail feathers glossy green, wing coverts edged with brownish and whitish; inner primaries with narrow white tips, long scapular plumes bluish-white glossed with green, lower parts grayish, darkest on sides. Bill greenish-black, except mandible on lower surface, also lores and eyes yellow; legs greenish yellow.

Young.—Head less crested and dull greenish-black, back and upper parts generally greenish; long scapular plumes absent; wing-coverts much more broadly bordered, brown and whitish than adult; many of larger wing feathers have showy white tips; chin, throat and front neck, whitish with dusky streaks; rest of and sides of head rather pale reddish-brown; lower parts, whitish with dusky stripes; edge of wing as in adult, white; color of eyes, legs and bill very similar to old bird.

Habitat.—Canada and Oregon, southward to northern South America and the West Indies; rare or absent in the middle province.

The Green Heron is known by a variety of local names, some of which are much more expressive than elegant. This bird, the most common and abundant of all our herons, is found throughout the state, frequenting rivers, streams and ponds. It arrives in this section occasionally as early as the first week in April, from the southern states, where it resides when the chilling blasts of winter have frozen over our streams and marshes. This species sometimes breeds in small companies; generally, however, but two or three pairs are found nesting together. The nests, built of sticks and twigs, are placed in low bushes or small trees adjacent to a stream or pond. The nests frequently are built in apple orchards. Indeed, the largest number of nests that I ever found in one locality was in an apple orchard along the Brandywine, where for several years some twenty-five or thirty of these birds annually resorted. While it is true that I have found these herons breeding in small numbers with the Night and Great Blue Herons in Pennsylvania, and also in Florida in company with the Little Blue, Louisiana and Snowy Herons, and even sometimes in the colonies of Water Turkeys and Cormorants, I

think, as a rule, they usually prefer to remain by themselves during the season of reproduction as well as at other times. Various writers state that the eggs are four in number. I have examined many nests, and consider the usual complement to be not less than five; frequently six eggs are laid. The eggs are pale-blue and larger than those of our common pigeon. This species feeds much more frequently on insects than other of the herons that reside with us. Nuttall writes of the Green Heron in the following language: "He is also particularly attracted by artificial ponds for fish, not refraining even to visit gardens and domestic premises which any prospect of fare may offer. He is, at the same time, perhaps as much in quest of the natural enemy of the fish, the frog, as of the legitimate tenants of the pond. These bold and intrusive visits are commonly made early in the morning, or towards twilight, and he not unfrequently, when pressed by hunger, or after ill-success, turns out to hunt his fare by day as well as dusk, and, at such times, collects various larvæ, particularly those of the dragon-fly, with grasshoppers and different kinds of insects. At other times he preys upon small fish, crabs and frogs, for which he often lies patiently in wait till they reappear from their hiding places in the water or mud, and on being transfixed and caught, which is effected with great dexterity, they are commonly beaten to death, if large, and afterwards swallowed at leisure."

Fourteen birds, examined by me, were found to have fed on the different materials named below:

No.	Date.	Locality.	Food-Materials.
1	June —, 1879.	Barnegat, N. J.	Beetles and other insects.
2	Oct. 10, 1879.	Chester county, Pa.	"Fall-fish."
3	April 29, 1880.	Chester county, Pa.	Frog and minnows.
4	April 29, 1879.	Chester county, Pa.	Fragments of insects and small quantity of hair, probably that of a field-mouse.
5	May 12, 1880.	Chester county, Pa.	Beetles.
6	July 3, 1880.	Delaware county, Pa.	Frog.
7	June 30, 1881.	Chester county, Pa.	Remains of small fishes.
8	Aug. 17, 1881.	Chester county, Pa.	Beetles and other insects.
9	May 14, 1882.	Lancaster county, Pa.	Fishes and frogs.
10	July 29, 1882.	Chester county, Pa.	Remains of small fishes.*
11	July 29, 1882.	Chester county, Pa.	Remains of small fishes.*
12	July 29, 1882.	Chester county, Pa.	Remains of small fishes.*
13	July 29, 1882.	Chester county, Pa.	Remains of small fishes.*
14	Sept. 4, 1883.	York county, Pa.	Dipterous and other insects.

* Four young birds taken from the nest.

Genus NYCTICORAX Stephens.

Nycticorax nycticorax nævius (Bodd.).

Black-crowned Night Heron; Squawk; Night-hen.

Description (*Plate 6*).

Bill very stout and thick; maxilla slightly curved; bill and tarsus each about 3 inches long; head and neck large, the latter quite short; body rather short and heavy.

Adult.—Length about 25 inches; alar extent, about 44; bill black; lores greenish-yellow; eyes red; legs yellowish; top of head and middle of back glossy-greenish

black (sometimes dull black with little or no greenish); a narrow stripe on forehead reaching to eye; sides of head, chin, throat and under parts white, often tinged with a faint yellowish or a very delicate light purple color; wings and tail ashy-blue; neck, except in front, similar but paler. The adults frequently have 3 long and white occipital feathers, which, when rolled together, appear as one thick round feather.

Young.—Bill (dried skin) black and yellowish; iris light yellow; legs yellowish; upper parts light-brown, spotted or streaked with whitish; tail about same as adult; sides of head and neck, and under plumage generally, striped with whitish and dusky. A young bird before me differs from the last chiefly in having top of head and large space on interscapular region, dull brownish-gray, without spots.

Habitat.—America, from the British possessions southward to the Falkland Islands, including part of the West Indies.

Next to the Green Heron the Night Heron is unquestionably the most abundant of the family in this state. The adult birds are easily distinguished from other herons by the black feathers on top of head and back, red eyes, and frequently three long, fine, white feathers, which grow from the base of the head. The appellation, Night Heron, is highly appropriate, as this bird is strictly nocturnal in its habits. During the daytime the Night Heron is inactive, and generally is found perched on a log or the limb of a tree in a quiet nook about the swamps and streams. As twilight approaches this drowsy wader becomes, as it were, a new being—impelled, no doubt, by the pangs of hunger—he stands erect, the loose and shaggy plumage, which before seemed ill-adapted to his body, now fits neat and closely as he carefully walks to the extremity of the dead and decorticated limb on which he has been dozing, and suddenly with a loud *squawk* launches himself into the air, uttering at short intervals his harsh note, and, rising above the trees of the forest, he speedily visits some favorite mill-dam. These birds arrive in Pennsylvania about the 25th of April and remain until the latter part of September. They seem to repair at once on their arrival in spring to localities where they are accustomed to breed. After the breeding season, *i. e.*, about the middle of August, when the young are amply able to provide for themselves these birds forsake their nesting-places and become quite plentiful along the rivers, streams and bushy marshes. The Night Heron rarely, if ever, breeds singly, but always in large companies. I have visited, on different occasions, two of these breeding resorts and found from twenty-five to seventy-five nests, which like those of the other species, were built of sticks and placed usually in high trees. In Berks county, near Blue Rock, for many years, this species annually reared their young in the edge of a large woods along the margin of which was a good-sized stream. In this place many of the nests were built in a bunch of saplings, some fifteen or twenty feet high and so small in diameter that it was impossible to climb them. Wilson has very properly said that the noise of the old and young in one of these breeding-places would induce one to suppose that two or three hundred Indians were choking or throttling each other. The same

writer, in referring to examinations which he made, states that the teeth of the pectinated claw were thirty-five or forty in number, and, as they contained particles of the down of the bird, showed evidently from this circumstance that they act the part of a comb to rid the bird of vermin in those parts which it cannot reach with its bill. The late Isaac G. Darlington, of West Chester, some years ago, had large numbers of gold-fishes in a pond near his residence. One day Mr. Darlington caught twenty-five of these fish and placed them in a small pool, intending to remove them the following morning. About bedtime, Mr. D. said, I heard a loud squawking, and on going out saw two Night Herons actively engaged in catching these fish. I shot one of these robbers, which you there see mounted, on the book-case, and on making an investigaton found only *one* of the fish remaining. "An incident may illustrate the habits of the Night Heron, and perhaps of the whole family. A Night Heron had been noticed for several days sitting on a tree near a branch of White Clay creek. It was at length shot and brought to me, with the tail of a large fish projecting four inches beyond its bill. On removing the fish (a sucker *Catostomus*, which must have been twelve inches long), its head and shoulders—except the bony portions—were eaten away by the gastric liquor of the stomach."—*Michener.* I have examined the stomachs of twenty odd of these herons, adult and young, which have been shot in June at the breeding-grounds, and found in all only the remains of fishes. In two or three immature birds, taken in August and September, I have discovered a few grasshoppers and portions of insects.

NOTE.—The Yellow-crowned Night Heron (*N. violaceus*) which is found in eastern North America, "from the Carolinas and the lower Ohio valley south to Brazil," has not, within the last twenty years, to my knowledge been observed in Pennsylvania. Dr. Turnbull,* writing of this species says: "A rare straggler from the south. It has been seen on the borders of the Schuylkill near Philadelphia."

* Birds of East Pennsylvania and New Jersey, published in 1869.

Red-tailed Hawk.

1. Male; 2. Female.

ORDER PALUDICOLÆ. RAILS, ETC.

SUBORDER RALLI. RAILS, COOTS, ETC.

FAMILY **RALLIDÆ**. RAILS, GALLINULES AND COOTS.

SUBFAMILY **RALLINÆ**. RAILS.

THE RAILS.

Six species are found in Pennsylvania either as summer residents, spring and fall migrants or casual visitants. These birds are difficult to flush, and when started they fly usually in a feeble manner, going mostly but a short distance when they alight and hide in the thick vegetation abounding in the marshes and swampy places which they inhabit almost habitually. Rails, when surprised in their marshy retreats, seem to prefer to escape by skulking in the reeds and grasses, but if closely pressed they make short flights, drop down suddenly, and secrete themselves or run with outstretched wings over extensive spaces of water, on which scattered leaves, blades of grass, or twigs, are resting. Rails, when wounded, particularly if winged, frequently escape by swimming. It is surprising how rapidly these slender-toed birds can escape in this manner; they also are quite expert in diving, and sometimes to escape their enemies will remain for a considerable time under the water—clinging by the long toes to plants—with only the bills above the surface. Rails lay six to twelve whitish, yellowish, or grayish and spotted eggs, in shallow nests built of blades of grass, reeds or small sticks, supported by tough grasses or rushes in ponds and marshes. The downy young of the King, Virginia, Clapper and Sora Rails are black. These birds feed largely on seeds, the tender leaves and buds of various water plants. They also eat cray-fish, worms, beetles and other insects. The Clapper (on salt-water marshes of Atlantic coast) and Sora Rails, which are killed in great numbers by sportsmen, are very highly esteemed game birds. The other species, equally as palatable, but with the exception of occasional examples of the King and Virginia Rails, are seldom seen in our markets. The Sora, and scattering individuals of other species, particularly the Virginia and King Rails, are often found, in August and early in September, in considerable numbers, in suitable locations, in different parts of this state. Sometimes during cloudy weather, at twilight and often in the night, particularly in the spring and breeding season, the loud, grating cries of these birds are heard in the meadows and marshes. In the genus *Rallus* the slender and slightly curved bill is much longer than the head; maxilla, particularly in the King Rail (*elegans*) and Clapper Rail (*crepitans*) with long and rather deep furrows, which start above and behind the linear nostrils and extend beyond basal half of bill. In *Porzana* the bill, shorter than head, is straight and thick with rather short, broad fossæ, deepest in front of the narrow nostrils. The head is feathered in front, *i. e.*, no broad horny frontal plate as in Coot and Gallinules; tibiæ naked below; toes, long and slender, without lobes or marginal membranes, and the wings are short and round. The tail has twelve short feathers.

GENUS **RALLUS** LINNÆUS.

Rallus elegans AUD.

King Rail; Big Red Rail.

DESCRIPTION.

Adult.—Length 18 inches; extent about 25. Bill little over 2 inches long. Bill (dried skin) maxilla blackish-brown, lower mandible paler, darker toward end;

legs and bare parts of tibiæ brownish; iris reddish. A pale streak from base of maxilla runs back over eye; lores dusky; top of head and back of neck dark-brownish, almost black; spot on lower eyelid, chin, most of throat, some feathers on edge of wing also some under tail coverts, white; sides and front of neck and breast bright rufous, growing paler below, belly in same birds is nearly white; wing-coverts similar to breast but darker. Feathers of upper parts generally, are mostly brownish-black, edged with olive-brown; lower part of abdomen, flanks and axillars blackish, with conspicuous transverse white bars.

Habitat.—Fresh-water marshes of the eastern province of the United States, from the Middle States, northern Illinois, Wisconsin and Kansas southward. Casually north to Massachusetts, Maine and Ontario.

Spring and fall migrant. Most frequently seen in fall, and much less common than either the Virginia or Sora Rails. Always observed singly or in pairs; often in same swamps with Sora and Virginia Rail during migrations. Probably a regular breeder in some of our extensive swamps and marshes. Specimens of this species have been shot by Messrs. James and Scott Thompson, in the late summer and early autumn, in the neighborhood of Erie city, and Mr. George B. Sennett has observed it in Erie county as a spring migrant. Dr. John W. Detwiller, of Northampton county, has found nests of this, also the Sora and Little Red Rail in Pennsylvania. Hon. Gerard C. Brown, York county; A. T. Lilley, Bradford county; Dr. A. C. Treichler, Lancaster county; D. Frank Keller, of Berks county, and Dr. Van Fleet, Clinton county, state that the King Rail occurs in their localities as a straggler. During the past ten years I have obtained in Delaware, Philadelphia and Chester counties about a dozen birds of this species; two of these were killed in spring and the others in August and September. The nest, a rude platform of grasses, weeds, etc., is placed on the ground or in a tussock of grass above the water, in a marsh. The eggs measure about 1.65 × 1.20, and are dull creamy white, dotted and blotched with reddish-brown and light-purple.

Rallus longirostris crepitans (Gmel.).

Clapper Rail; Mud Hen.

Description.

This bird is similar in form but somewhat smaller than *R. elegans* which it resembles in general appearance, but lacking the bright rufous as well as other darker colors of the King Rail.

Adult.—Bill averages a trifle longer than *elegans*. Length about sixteen inches; bill (dried skin), upper half of maxilla brownish, rest of maxilla except end which is brownish, and most of lower mandible pale yellowish brown; legs grayish-yellow brown; iris brownish. Top of head, back of neck and upper parts generally grayish-olive brown; feathers have dark centers and paler margins; chin, upper throat, streak over eye, spot on under eye-lid, and middle of abdomen whitish; sides, flanks, under wing coverts and axillars dusky grayish-brown, barred with white; greater part of neck in front, sides of same, and lores, ashy-gray; breast grayish-white, with a pale reddish-yellow tinge; this latter color in specimen before me is well shown on front of neck.

Habitat.—Salt marshes of the Atlantic coast of the United States, from New Jersey southward; resident from the Potomac southward, casually north to Massachusetts.

The Clapper Rail or Mud-hen is the noisy game bird which is often killed in such great numbers about the salt-water marshes in the neighborhood of Atlantic City, New Jersey. In Pennsylvania this rail has been found as a very rare, or, more probably, accidental visitor. The late Judge Libhart records the capture of one in Lancaster county by Mr. G. W. Hensel; and Dr. Detwiller has also taken it in the state. A bird of this species was shot near Chester city, Delaware county, September, 1880, by ex-Sheriff George R. Hoopes, of West Chester and presented to me.

Rallus virginianus Linn.

Virginia Rail; Little Red Rail.

Description (*Plate 78*).

Much smaller than either the Clapper or King Rails, but resembling them in form and resembling also *R. elegans* in colors.

Adult.—Nine or ten inches long and about fourteen in extent. Specimen before me has sides of head mostly grayish-ashy, little or no white about lower eye-lid, otherwise same as King Rail previously described. Specimens are occasionally taken in which the neck and breast are more or less black.

Habitat.—North America, from British provinces and south to Guatemala and Cuba.

Notwithstanding the fact that the plumage of the Virginia and King Rails is similar, the species can readily be distinguished by the great difference in size, the Virginia Rail being only about one-third as large as the King Rail. This species arrives in Pennsylvania by the first of May and remains with us until the middle of October—specimens have been killed during the first week in November. These birds, although only occasionally observed, are, I am certain, much more plentiful about our large swamps and marshy river borders than it is usually supposed. Frequenting, as they do at all times, however, marshy districts, which are thickly covered with various grasses, bushes, reeds, etc., it is rather exceptional to see them. Like all the rails, they are shy and timid. If approached they seldom fly, but run rapidly and quickly conceal themselves among the thick tussocks or other suitable cover. They are seemingly in no way impeded in making their retreat even across large-sized spaces of water on which are floating a few blades of grass, leaves or twigs, over which they run with the same celerity as when on the ground. The nest, a frail structure consisting mainly of grass, is built commonly in a tussock located generally in the most inaccessible portion of the swamp. The eggs, it is said, vary in number from six to ten and are dirty white, with numerous spots and different shades of brown. Nuttall says: "The female is so much attached to her eggs, after sitting, as sometimes to allow of being taken up by the hand rather than desert the premises,

which affection appears the more necessary as the male seems to desert his mate and leave her in the sole charge of her little family."

The Virginia Rail breeds in Chester and Delaware counties. Prof. August Kock writes as follows of the species in Lycoming county: "Breeds sparingly, and I think in single pairs, at least I have never found more than one family in a locality." In the counties of Clinton, Clearfield and Northumberland, Dr. Van Fleet says this rail breeds quite regularly. In other counties the Little Red Rail is reported to me by the following gentlemen, either as an occasional, or regular, but not common summar visitant: Lancaster, Dr. A. C. Treichler; Philadelphia, Rev. Jos. Johnson; Cumberland, T. L. Neff; Luzerne, Dr. W. L. Hartman; Lehigh, J. F. Kocher; Berks, D. F. Keller; Susquehanna, Dr. H. A. Tingley. The food materials of eleven birds, of this species, are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	Sept. 3, 1879.	Delaware county, Pa.	Beetles.
2	Sept. 15, 1879.	Philadelphia Market, Pa.	Insects and small seeds.
3	Sept. 15, 1879.	Philadelphia Market, Pa.	Fragments of beetles.
4	May 13, 1880.	Chester county, Pa.	Earth-worms.
5	May 30, 1880.	Chester county, Pa.	Beetles and vegetable matter.
6	July 20, 1882.	Chester county, Pa.	Beetles.
7	Oct. 5, 1882.	Delaware county, Pa.	Insects and small seeds
8	Aug. 14, 1883.	Wilmington, Del.	Beetles.
9	Sept. 2, 1884.	Delaware county, Pa.	Beetles.
10	Sept. 2, 1884.	Delaware county, Pa.	Small "worms."
11	Sept. 2, 1884.	Delaware county, Pa.	Beetles and seeds.

Genus **PORZANA** Vieillot.

Porzana carolina (Linn.).

Sora; Carolina Rail; Rail-bird; Common Rail; "Ortolan."

Description (*Plate 7*).

Length, about 9 inches; extent, about 13; bill about three-fourths of an inch long. This species shows great variations in plumage, in perfect dress the sexes are alike. Young or immature birds lack the black of face, chin and throat; the throat and the breast, often streaked or patched with bluish-ash, is brownish.

Adult, in Spring.—Upper parts olive-brown and black, and many feathers spotted or streaked on edges with white, flanks and axillars, barred with black and white; feathers about bill, chin and throat black; line over eye, sides of head, portion of neck and breast, plain lead color; belly, grayish-white; under tail coverts, rusty white; bill (dried skin) greenish yellow, dark toward end; legs dark greenish; iris brown.

Habitat.—Temperate North America, but most common in the eastern province, breeding chiefly northward. South in winter to the West Indies and northern South America.

The Carolina Rail and Virginia Rail resemble each other in size and form, but otherwise are greatly different. First, they differ in plumage, secondly, the bill of the Carolina Rail is about three-fourths of an inch long, while in the Virginia Rail this organ is often over one and one-half inches in length; again, the legs of the Carolina Rail are greenish-

1. Broad-winged Hawk. *2, 3. Sparrow-Hawk.*

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yellow, those of the Virginia Rail are dull reddish-brown. This species and the preceding may be said to be the only rails which are common in Pennsylvania. The Carolina Rail arrives here about the first week in May. During the latter part of August and early in September, it is not uncommon to find these birds in parties numbering from six to twenty, sometimes many more,* in swamps and wet grassy meadows.

The Sora has been found breeding in Chester county, along the Brandywine, and it occurs in different localities in Pennsylvania as a regular or occasional summer resident. In Montgomery county, Mr. Thomas S. Gillin, of Ambler, has noted it as an occasional breeder, and Mr. George B. Sennett says it breeds occasionally in Erie county. Prof. August Kock states that in Lycoming county "they breed in small colonies in small open swamps, which are grown with a few small bushes." In Lancaster county, both Dr. Treichler and Mr. William N. Buller, mention the Sora as a native. Dr. Isaiah F. Everhart and Mr. George P. Friant, of Scranton, have young birds, captured in Lackawanna county. Dr. Van Fleet, Clinton county, and Mr. D. Frank Keller, Berks county, have found it breeding. "Eggs 8–12, 1.23 x .89 brownish buff, rather sparsely spotted with brown and purplish gray."—*Ridgway Manual N. A. Birds.*

The food materials which were found in the stomachs of sixteen of these birds are given below:

No.	Date.	Locality.	Food-Materials.
1	Sept. 8, 1880,	Near Chester city, Pa.,	Green-colored vegetable matter.
2	Sept. 8, 1880,	Near Chester city, Pa.,	Brown-colored seeds, large and small.
3	Sept. 8, 1880,	Near Chester city, Pa.,	Brown and yellow-colored seeds.
4	Sept. 8, 1880,	Near Chester city, Pa.,	Brown and yellow-colored seeds.
5	Sept. 8, 1880,	Near Chester city, Pa.,	Yellow seeds and particles of shells.
6	Sept. 8, 1880,	Near Chester city, Pa.,	Green-colored vegetable matter.
7	Sept. 8, 1880,	Near Chester city, Pa.,	Seeds and other vegetable matter.
8	Sept. 8, 1880,	Near Chester city, Pa.,	Yellow-colored seeds.
9	Sept. 8, 1880,	Near Chester city, Pa.,	Yellow and brown-colored seeds
10	Sept. 8, 1880,	Near Chester city, Pa.,	Seeds and other vegetable matter.
11	Sept. 8, 1880,	Near Chester city, Pa.,	Seeds and other vegetable matter.
12	Sept. 8, 1880,	Near Chester city, Pa.,	Seeds and other vegetable matter.
13	Oct. 3, 1880,	Pocopson, Pa.,	Black-colored seeds.
14	May 3, 1882,	Chester county, Pa.,	Small "worms."
15	July 20, 1884,	Chester county, Pa.,	Small green seeds.
16	Aug. 12, 1884,	Chester county, Pa.,	Beetles and vegetable matter.

Porzana noveboracensis (Gmel.).

Yellow Rail.

Description.

"Entire upper parts ochre-yellow, with longitudinal wide stripes of brownish-black and transverse narrow stripes of white; neck and breast reddish ochre-yellow; many feathers tipped with brown; middle of abdomen white; flanks and ventral region with transverse bands of dark reddish-brown and narrow bands of white; under tail coverts rufous with small spots of white and black; under wing-coverts white. Length (from tip of bill to end of tail), about 6 inches; extent about 13; wing $3\frac{1}{4}$; tail $1\frac{3}{4}$; bill $\frac{1}{2}$ inch."—*B. B. of N. A.*

* Mr. James Thompson, of Erie city, informs me that upwards of eighty of these rails have been taken in a day about the ponds on the peninsula at Erie bay. In these ponds wild rice grows in abundance, and rails as well as many other water birds, resort there to feed on the seeds of this plant.

Habitat.—Eastern North America, from Nova Scotia and Hudson's Bay west to Utah and Nevada. No extra-limital record except Cuba and the Bermudas.

Birds of this species are occasionally taken about our rivers and meadows during the spring and fall migrations. I have seen two specimens which were captured in the early part of July, 1882, in Delaware county, near Chester city. It is possible that this little rail sometimes breeds in Pennsylvania, yet I have no positive information to this effect. The eggs, according to different writers, vary from six to ten, and are described as creamy buff, marked at the larger end with reddish spots, and measure about 1.13 by .82 inches.

Porzana jamaicensis (GMEL.).

Black Rail.

DESCRIPTION.

"Upper parts blackish, finely speckled and barred with white, the hind neck and fore back dark chestnut. Head and under parts dark slate color, paler or whitening on the throat, the lower belly, flanks, and under wing and tail-coverts barred with white. Quills and tail-feathers with white spots. Very small; length about $5\frac{1}{2}$; wing $2\frac{3}{4}$ to 3; tail $1\frac{1}{3}$; tarsus $\frac{3}{4}$."—*Coue's Key.*

Habitat.—Temperate North America, north to Massachusetts, northern Illinois and Oregon; south to West Indies and in western South America to Chili.

This diminutive, shy and secretive bird—the smallest of our North American rails—is said to have been found, many years ago, breeding in the neighborhood of Philadelphia, by the late John Krider. I have seen two specimens which were shot in September, on the Delaware, near Chester city. Dr. John W. Detwiller, of Bethlehem, has captured this species in his locality; George R. Ross, of Lebanon, says that he has taken two in Lebanon county, one, August, 1879, the other August, 1880. I have never seen the eggs of the Black Rail. Mr. Ridgway* says they number "about nine, 1.01 by .79, white or buffy white, sprinkled, or finely speckled, chiefly on the larger end, with dark reddish-brown or chestnut."

SUBFAMILY GALLINULINÆ. GALLINULES.

THE GALLINULES.

The Gallinules are found in the same localities as the rails, to which they are quite similar in habits. Two species occur in the United States, and both are found in Pennsylvania. They have a broad, bare, and often highly colored horny plate on the forehead; bill short and similar in shape to birds of the genus *Porzana*. Feet large and stout; toes long, "and in *G. galeata* with a slight marginal membrane." Gallinules nest in marshes, and lay many yellowish or buff-colored and spotted eggs.

* *Manual of North American Birds, p. 140.*

Barn Owl.

GENUS **IONORNIS** REICHENBACH.

Ionornis martinica (LINN.).

Purple Gallinule.

DESCRIPTION.

"Head, neck and under parts beautiful purplish-blue, blackening on the belly, the sides and lining of wings bluish-green, the crissum white. Above, olivaceous-green, the cervix (hind neck) and wing-coverts tinged with blue. Quills and tail feathers blackish, glossed on the outer webs with greenish. Frontal shield blue (or dusky); bill carmine, tipped with yellow; legs yellow. The young with the head, neck and lower back brownish, the under parts mostly white mixed with ochrey. Length 12–14; extent about 22."—*Coues.*

Habitat.—South Atlantic and Gulf States, casually northward to Maine, New York, Wisconsin, etc.; south throughout the West Indies to Brazil.

The Purple Gallinule, a southern species, is a very rare and irregular visitor as far northward as Pennsylvania. Joseph Krider, two or three years ago, had a specimen which was taken near Philadelphia. In other localities stragglers, at irregular intervals, have also been captured and reported to me as follows: York county, Casper Loucks and George Miller; Mercer county, S. S. Overmoyer; Luzerne county, Dr. W. L. Hartman.

GENUS **GALLINULA** BRISSON.

Gallinula galeata (LICHT.).

Florida Gallinule; Blue Rail.

DESCRIPTION (*Plate 66*).

Adult.—Length about 14 inches; extent about 20 inches; general color grayish-black, darkest on head and upper hind neck; lightest, and sometimes quite white on abdomen; middle of back, brownish-olive; edge of wing, outer edge of first primary, some of under tail-coverts, and stripes on the flanks, white. Frontal plate and ring about lower part of tibiæ red (the red color on frontal plate and tibiæ is oftentimes hardly noticeable in specimens taken in autumn and in immature birds the frontal shield is rudimentary, and the bill is brownish). Bill red with yellow end; legs greenish-yellow; iris brown. The young have much white or whitish on under parts.

Habitat.—Temperate and tropical America, from Canada to Brazil and Chili.

Regular, but rather rare spring and fall migrant. Probably breeds. Reports which I have received from twenty-two naturalists and collectors residing in different counties of the northern, southern, eastern, western and central parts of the state, show that the species is generally distributed in suitable localities throughout the commonwealth. All of my informants mention this Gallinule—called by sportsmen Blue Rail—as a straggler or very rare migrant. The Messrs. Baird mentions this species as a rare native in Cumberland county. Their food, according to Audobon, "consists of grasses, seeds, water insects, worms and snails, along with which they swallow a good deal of sand or gravel."

No.	Date.	Locality.	Food-Materials.
1	May 11, 1879, ...	Chester county, Pa., ...	Vegetable matter (green-colored).
2	Sept. 8, 1880, ...	Near Chester city, Pa., . . .	Seeds.
3	Sept. 15, 1880, ...	Near Chester city, Pa., . . .	Seeds and green-colored vegetable matter.
4	Oct. 20, 1883, ...	Philadelphia, Market, Pa., . .	Black-colored seeds.

In addition to the examinations given in the above table, I found in the gizzards of five of these birds, which were killed in Florida, in March, 1885, numerous small yellow and brown seeds; also the stems and leaves of different kinds of aquatic plants.

Subfamily **FULICINÆ**. Coots.

THE COOTS.

Only one species of this subfamily is found in the United States. Coots frequent the same localities in which are found the rails and gallinules. They resemble in many ways their near relatives, the gallinules, from which, however, they can easily be recognized by the large semicircular lobes on front toes. Coots spend much of their time in the water, in which they swim and dive with ease.

Genus **FULICA** Linnæus.

Fulica americana Gmel.

American Coot; Mud-hen; Crow Duck.

Description (*Plate 8.*)

Adult, in spring.—Bill short, thick and white or nearly so; frontal plate and spot near end of each mandible reddish-brown; head and neck black; edge of wing, tips of secondaries, and some of lower tail-coverts white; rest of plumage dark grayish-lead color, lighter on belly than elsewhere; eyes reddish or brown; legs dark greenish-yellow; length about 14 inches; extent about 28. The young of this species are similar but everywhere much paler in color.

Habitat.—North America, from Greenland and Alaska, southward to the West Indies and Central America.

The American Coot, commonly known in eastern Pennsylvania as Mud-hen,* breeds in various localities throughout its extensive range. In the British Provinces it is said to be quite a common summer resident. Mr. Samuels remarks that it breeds probably in all the New England States. Dr. Coues has found it breeding in northern Montana and Dakota. Mr. H. W. Henshaw found them to be very numerous at the alkali lakes, southern Colorado, where, according to this eminent authority, "they breed in colonies among the rushes, the nests often being but a few feet apart. These are very bulky structures, composed of weeds and rushes raised to a height of several inches from the surface of the water, so that the eggs are kept perfectly dry, and are moored to the stems of the sur-

* The vernacular name of Mud-hen is also given to the Clapper Rail (*Rallus longirostris crepitans*—Gmel.) which breeds so abundantly in the extensive marshes about Atlantic City and elsewhere on the Atlantic coast in New Jersey and southward.

rounding reeds." During the winter months coots may be seen in large flocks along the St. John's river, Florida; at "Mud Lake," about ten miles north of Sanford, I have seen over a thousand in one flock.

The coot is found throughout Pennsylvania as a common spring and fall migrant—April, September and October—frequenting usually sloughs, pools and sluggish streams. They generally are much more numerous in autumn than in spring; and at Erie bay these birds are frequently seen, especially in the fall, in flocks, swimming among the reeds and rank grasses near the shore. I have never observed the coot in Pennsylvania in the breeding season, and am quite certain it *seldom* breeds here. Lists of birds received by me from naturalists and collectors, residing in all but five or six counties of the commonwealth, with two exceptions, show that the coot has been noted only as a spring and fall visitor. That it has been found breeding in at least two localities, there appears to be no doubt, as both Mr. S. S. Overmoyer, of Mercer county, and Dr. John W. Detwiller, of Northampton county, mention it as a native. "Eggs, about a dozen, 1.75 to 2.00 long by 1.20 to 1.35 broad, shaped like an average hen's egg, clear clay-color, uniformly and minutely dotted with dark brown, the spots usually mere pin-heads, sometimes large blotches. The nest is sometimes on dry ground a little way from water. The young hatch covered with black down, fantastically striped with bright orange-red, with vermillion bill tipped with black."—*Coues.*

Audubon states that its food consists of seeds, grasses, small fishes, worms, snails and insects, along with which it introduces into its stomach a good quantity of rather coarse sand. Nuttall observes that they feed principally on aquatic vegetable substances, as seeds, leaves, etc. In March, 1885, I obtained seventeen coots at Little Lake George, Florida, and found in the stomachs of all only small seeds, blades of grass, with, in most every instance, a small quantity of sand or gravel. Six of these birds, which I have obtained in Chester county, Pa., had only vegetable materials, small black and yellow seeds, also sand in their muscular gizzards.

ORDER LIMICOLÆ. SHORE BIRDS.

FAMILY **PHALAROPODIDÆ.** PHALAROPES.

THE PHALAROPES.

Three species of this family are found in the United States, and two, at least, occur more or less regularly in Pennsylvania. Although these birds resemble, in many respects, the sandpipers, they can readily be distinguished from the latter by the curious lobate feet, like those of the grebes and coot, previously described. Phalaropes, the smallest of our swimming birds, spend much of their time in the water, on which they swim in an easy and graceful manner. The under plumage is com-

pact like a duck's to resist water. These birds undergo marked changes of plumage with age and season. The bills, as well as the marginal membranes of the toes, all differ in slight particulars, but the toes in all these species are united by basal webs. Two species are recorded as breeding only in the Arctic regions, but they all migrate southward in winter and two, at least, penetrate to the tropical countries. The Phalaropes, it is stated, nest on the ground, and lay three or four olive-buff or pale grayish-buff colored eggs, spotted with different shades of brown. These peculiar birds, combining as they do to a certain degree, both the habits and appearance of certain waders and swimmers, frequent both salt and fresh water. Their food, it is said, consists principally of aquatic insects, worms, molusca, etc.

GENUS **PHALAROPUS** BRISSON.

Phalaropus lobatus (LINN.).

Northern Phalarope.

DESCRIPTION.

Length about 7½ inches; extent about 14; bill and legs blackish; iris brown; the bill, less than an inch long, is straight and pointed; the wings are long, and the tail is short and rounded; membrane of toes scolloped at joints.

"*Winter plumage* (*adult*).—Forehead, superciliary stripe, sides of head and neck with lower parts generally pure white; top of head grayish, the feathers with dusky shaft-streaks and whitish borders; a blackish spot in front of eye and side of head, from beneath eye, across ear-coverts mixed dusky and grayish-white; upper parts chiefly grayish; sides of chest washed or clouded with grayish.

"*Young.*—Top of head dusky, with or without streaks; back and scapulars blackish, distinctly bordered with buff or ochraceous; middle wing-coverts bordered with buff or whitish; forehead, supra-auricular stripe, lores and lower parts white, the chest and sides of breast sometimes suffused with dull brownish; ear-coverts dusky."—*Ridgway Manual of N. A. Birds.*

Habitat.—Northern portions of northern hemisphere, breeding in Arctic latitudes; south in winter to the tropics.

At Erie bay and about the lake shore in Erie county this phalarope is found as a rather regular but not common migrant, seen most frequently in the fall. In other sections of the state the Northern Phalarope is a rare and irregular visitor. Prof. August Kock has observed it in Lycoming county as a "rare migrant." Stragglers have also been captured, at irregular intervals, during recent years, about the rivers Delaware, Susquehanna and Ohio.

Phalaropus tricolor (VIEILL.).

Wilson's Phalarope.

DESCRIPTION.

Length about 9 inches; extent about 15½ inches; bill and legs black; iris dark-brown; bill about 1⅛ inches long, cylindrical, tapering, slender and acute; lateral membrane of all the toes even or unscolloped.

"*Winter plumage.*—Above plain ash-gray; upper tail-coverts superciliary stripe and lower parts white, the chest and sides of breast shaded with pale-gray.

"*Young.*—Top of head, back and scapulars dusky blackish, the feathers distinctly bordered with buff; wing-coverts also bordered with pale buff or whitish; upper tail-coverts superciliary stripe and lower parts white, the neck tinged with buff."—*Ridgway's Manual of N. A. Birds.*

Screech Owl.

[illegible]

Habitat.—Temperate North America, chiefly in the interior, breeding from northern Illinois and Utah northward to the Saskatchewan region; south in winter to Brazil and Patagonia.

Rare and irregular migrant throughout the state, but at Erie bay small flocks of these phalaropes are sometimes to be seen in the fall swimming in the water like ducks.

NOTE.—The Red Phalarope (*Crymophilus fulicarius*) which appears to be more exclusively maritime than the others, can easily be distinguished by the bill, which is short, stout and broad, with lancet-shaped tip. The Red Phalarope was mentioned in the first edition of the *Birds of Pennsylvania* on the authority of Mr. C. D. Wood, of Philadelphia, who had two specimens, both of which I have since learned were taken in New Jersey, and not at Philadelphia, as I had first been informed.

FAMILY **SCOLOPACIDÆ.** SNIPES, SANDPIPERS, ETC.

About twenty species of this large and important family, including several species which are eagerly sought after by the sportsmen and highly prized by epicures, are found in Pennsylvania during migrations or as summer residents. The great majority of the members of this family breed in high northern regions; three species—the American Woodcock, the Spotted and Bartramian Sandpipers—breed regularly and generally throughout our state. Some of these birds are solitary, but most of the species, when migrating are gregarious, and often they are seen in large flocks, which frequently contain different species. Although many of these birds occur in all parts of the commonwealth, more species and individuals, particularly in large flocks, are to be observed during the spring and fall migrations at Erie bay and about the lake shore in Erie county than in other localities of the state. The Snipes and Sandpipers, with a few exceptions, inhabit commonly the muddy and sandy shores of rivers, lakes, creeks and ponds; they likewise frequent, swamps and marshy meadow lands, and some of them are also to be found, usually, about bogs and watery places in woods and thickets. "The general econony of these birds is similar to that of a plover, a chief peculiarity being probably their mode of procuring food, by feeling for it, in the majority of cases, in the sand or mud with their delicately sensitive probe-like bill. The eggs are commonly four, parti-colored, pointed at one end and broad at the other, placed with the small ends together in a slight nest or mere depression on the ground; the young run about at birth."—*Coues Key of N. A. Birds.* These birds subsist almost exclusively on an animal diet, consisting mainly of insects, worms, water leeches, etc.

GENUS **SCOLOPAX** LINNÆUS.

Scolopax rusticola LINN.

European Woodcock.

DESCRIPTION.

"No outer primaries shortened or peculiar, the first narrowed somewhat on inner web near end; first and second longest, third little shorter, fourth much shorter; wings long, comparatively * * *. Generic characters, excepting those of wing, much as in *Philohela;* same style of bill and feet and configuration of body and head; plumage similarly variegated above, but below barred crosswise throughout; size much superior.

"*Cock bird.*—Colors above harmoniously blended and varied black, brown, chestnut and yellowish-gray; under parts brownish-white, regularly wavy-barred throughout with dark brown. A dusky stripe from bill to eye. Top and back of head brownish-black and brown, divided by three or four cross-bars of brownish-white and brown. Each feather of upper parts chestnut and black, in variegation, the black usually forming a large sub-terminal spot. Yellowish-gray tending to form a scapular stripe on each side of back. Quills and coverts of wings blackish, pretty regularly varied with dark chestnut bars, on the larger quills this chestnut paler and reduced to marginal indentations; outer web of first primary plain whitish. Upper tail-coverts rich chestnut, little varied with black, with pale tips. Tail feathers black, with angular chestnut indentations of outer webs; their tips gray from above, viewed from below glistening silvery-white. Under parts brownish-white, more or less suffused with chestnut-brown on breast, the regular dusky barring only giving way on the whitish throat, changing to lengthwise streaks on under tail-coverts.

Hen.—Unmistakably similar—substantially the same; grayer above, much of the russet mottling of the male replaced by hoary-gray, * * * (about a third larger than *P. minor*); weight 12 to 15 ounces. Over a foot long; wing seven inches or more; tail 3½; bill only about as long as in our woodcock."—*Coue's Key to N. A. Birds.*

Habitat.—Northern parts of the Old World; occasional in eastern North America.

From several reports, about a half dozen in all, received during the last ten years, from gunners in eastern Pennsylvania and New Jersey, I am inclined to the opinion that this bird is oftener met with on this side of the Atlantic than it is generally supposed. Not having any specimens of the European Woodcock in my collection, I have quoted from Dr. Coue's Key, a very full description of the generic and specific characters of the species, in order that sportsmen will have no difficulty in identifying stragglers which may come into their possession. At least two of these birds have been captured, during recent years, in Pennsylvania. Dr. John W. Detwiller informs me that Mr. John Mack, of Bethlehem, shot one several years ago, while hunting American Woodcock, in Northampton county. In the early part of November, 1886, Mr. David M. McFarland, a prominent banker, residing at West Chester, killed a large female of this species, when hunting quail on the "barrens," in East Nottingham township, Chester county. September, 1889, I found one of these woodcock in the possesion of a game dealer in Philadelphia, which he said had been sent to him, with a lot of Sora and reed birds, from New Jersey. This bird, unfortunately, was too far gone to be preserved.

GENUS **PHILOHELA** GRAY.

Philohela minor (GMEL.).

American Woodcock; Bog-sucker; Wood-snipe.

DESCRIPTION (*Plate 79*).

Body rather heavy; neck short and thick; eyes, head and bill large; ears beneath eyes; wings short and rounded, the first three primaries very narrow and shorter than fourth; fourth and fifth primaries longest. The tarsi about 1.25 long, are rather stout; tibiæ feathered to the joints; toes long and slender, without marginal mem-

branes or basal webs. Bill (five specimens measured) over 2½ inches long, straight and tapering, and stout at base; the ridge at base of maxilla is high; the upper mandible, a little longer than the lower, is knobbed at end. Three long grooves, one on ridge above, and others on each side of maxilla; gape short and narrow. The sexes are alike, but female is larger than male.

Adult.—Length 10 to 12 inches; extent 15 to 18 inches; eyes brown; weight varies from 4 to 9 ounces. Legs and bill (dried skin) pale brownish. Upper parts black, gray, russet and brown; chin whitish, rest of under parts brownish-red color of different shades.

Habitat.—Eastern province of North America, north to the British provinces, west to Dakota, Kansas, etc., breeding throughout its range; no extralimital records.

This bird, well known to sportsmen, is frequently confounded by the casual observer with the Wilson's Snipe. The error, however, can readily be avoided if you bear in mind that the woodcock has entire lower parts, including lining of wings, reddish-brown; on the other hand, the snipe has abdomen white, throat and upper parts of the breast speckled and the lining of the wings barred with white and black. The woodcock arrives in Pennsylvania about the middle of March, sometimes earlier, and occasionally a few are found during the "warm-spells" of winter lingering about the spring-heads. This bird, strictly speaking, is an inhabitant of the lowlands and boggy districts of our woods and dense thickets. Oftentimes during the fall migrations it is found along the muddy shores of streams, etc., or in the late summer when its usual feeding-grounds have become dry and hard through the continued summer's heat, it resorts to corn fields where it probes the humid soil in search of food. I am not positive that the "Wood-hen, as some æsthetic market-women prefer to call her," makes any attempt to build a nest. In April, on three occasions, I have found eggs, and once (May 10) took four young, but a few days old, all of which were on the ground in the woods. The eggs were deposited in slight depressions in the earth, in and about which were dried leaves; the young birds were discovered on a lot of dead oak-leaves, and from the appearance of their bed I judge they had been there only a short time. It is stated by Dr. Coues "that the young are sometimes removed from danger by the parents carrying them with the feet." The eggs, generally four in number, are grayish-white or buff, spotted with brownish and purplish-gray. The woodcock is principally nocturnal in its habits, and during the fall migrations it is often found in considerable numbers in favorite resorts.

Nuttall says: "According to their usual habits, they keep secluded in the woods and thickets till the approach of evening, when they sally forth to seek out springs, paths and broken soil, in quest of worms and other insects, on which they feed. They now disperse themselves over the country to breed, and indicate their presence in all directions by the marks of their boring bills, which are seen in such soft and boggy places as are usually sheltered by thickets and woods. They also turn over the fallen leaves from side to side with their bills in quest of lurking insects, but never scratch with their feet, though so robust in appearance.

The sensibility possessed by the extremity of the bill, as in the snipe, is of such an exquisite nature that they are enabled to collect their food by the mere touch, without using their eyes,* which are set at such a distance and elevation in the back part of the head as to give the bird a remarkable aspect of stupidity."

Although this species is very generally dispersed throughout the state, it appears, from reports received through different sources, that some of the principal localities visited by sportsmen are in the swampy districts of Wayne, Bradford, Susquehanna, Cumberland, Crawford and Erie counties; also in Clarion and Venango at different points on the Allegheny Valley railroad, and good woodcock shooting is said to be found, in July and August, at the "Black Swamp," in Montour county, near Danville, on the Delaware, Lackawanna and Western railroad.

The food-materials of nine woodcock examined by the writer are given below:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	May 10, 1879,	Willistown, Pa.,	Small fragments of "worms."*
2	May 10, 1879,	Willistown, Pa.,	Small fragments of "worms."*
3	May 10, 1879,	Willistown, Pa.,	Small fragments of "worms."*
4	May 10, 1879,	Willistown, Pa.,	Small fragments of "worms."*
5	May 10, 1879,	Willistown, Pa.,	Earth-worms and fragments of beetle.†
6	July 20, 1882,	Chester county, Pa.,	Spider and unrecognizable insects.
7	Aug. 3, 1884,	Delaware county, Pa.,	Insects and larvæ.
8	Oct. 20, 1882,	Schuylkill county, Pa.,	Beetles and earth-worms.
9	Nov. 8, 1880,	Delaware,	Small seeds.

* All young birds. † Parent of above.

GENUS GALLINAGO LEACH.

Gallinago delicata (ORD.).

Wilson's Snipe; English Snipe; Jack-snipe.

DESCRIPTION (*Plate 9*).

The body is more slender and head and neck smaller than in *Philohela*. About a quarter of an inch on lower part of tibiæ naked; ears under eyes; the three first primaries are longest, and the rather long wing is more pointed than that of a woodcock; bill (three specimens measured) about two and one-half inches long, not very stout at base, and straight; both mandibles have grooves on sides, extending from base to near the end; in life the bill is vascular, sensitive, and soft toward the end where it widens; in dried specimens about one inch of the bill toward end is pitted; short, rounded tail-feathers with transverse bars; toes long and slender without basal webs or marginal membranes; sexes similar.

Adult.—Length about 11 inches; extent about 18 inches; female a little smaller; bill (dried skin) brownish; legs blackish-brown; iris brown; top of head blackish,

* The eyes, being situated high up and far back in both the snipe and woodcock (well shown in plate No. 9, fig. 1), is a wise provision of nature, as these birds, by this peculiarity, escape many of their enemies. It can easily be understood by this arrangement that the field of vision is greatly increased. Obtaining their sustenance, as they do, chiefly by probing with their long bills, so amply supplied with nerves, they have comparatively little use for their eyes when feeding, unless it is to keep a watch for their numerous foes.—*Warren*.

with a pale buff middle stripe, and a streak of same color extends from base of maxilla back over each eye; chin and upper throat yellowish-white; neck and breast spotted and streaked with black, dusky, and different shades of brown; belly and outer web of first primary, white; back and upper parts generally blackish varied with different shades of brown and whitish; the pale yellowish edges of scapulars form two long stripes on back, separated by a broader streak of black or blackish; axillars and lining of wings barred with black and white; sides whitish with transverse dusky bars; tail feathers chiefly black, with a transverse and broad band of bright reddish-brown, succeeded by a narrow black band, and the ends almost white; primaries mostly dark brown on upper surface and paler below.

Habitat.—North and middle America, breeding from the northern United States northward; south in winter to the West Indies and northern South America.

This bird, usually, though improperly, called "English Snipe," arrives in Pennsylvania about the last week in March, and is common until about the middle of May, after which the species is seldom seen until the fall migration occurs. Wilson's Snipe *is not* found in woods or dense thickets, but at times, when sojourning here, is seen about open places in wet meadows, swamps, and on the muddy banks of streams and ponds, and in the early spring he shows a special preference for spring-heads, about which, at this time, the tender blades of grasses grow in abundance. These birds are found singly, or in small flocks of three, five, a dozen or twenty each. According to my experience these flocks, or "wisps" as they are often called, are much more frequently met with in spring than at other times, in nearly every section of the state, except in the vicinity of Erie city, where I have several times in the late fall observed "wisps" of a dozen or more. They return here from the northern breeding grounds in September, and individuals are often seen as late as the middle of November, occasionally during "warm spells" in December and January stragglers have been captured in the counties of Chester and Delaware. Their sharp cry of *scape, scape,* is uttered soon after they arise from the ground, and as they fly rapidly off in a zigzag manner, which leads many sportsmen to consider them as one of the most difficult birds to shoot. Wilson's Snipe is also found in this state as a rare and occasional breeder. Mr. George B. Sennett informs me it was found breeding, about ten years ago, in Crawford county; Mr. Samuel Thompson, of Erie city, reports having discovered a nest and four eggs in June, 1889, in a swamp near the Erie county poor-house. In Bradford county Mr. J. L. Camp, of Herrick, also Mr. J. M. Ketcham, of Minnequa, have observed it as a rare summer resident. Dr. H. A. Tingley, of Susquehanna, says it has been known to breed in his locality, and Dr. G. A. Scroggs, of Beaver, tells me it has been taken in June and July in Beaver county. Individuals of this species have been shot in summer near West Chester, also in Delaware county, but on examining them I found that, although able to fly a short distance, they were so crippled from wounds received during the spring shooting season that they were unable to perform any extended

migrations. Should these cripples remain in a locality during the summer months, I have no doubt some of them might reproduce.

According to Audubon, "the food of our common snipe consists principally of ground-worms, insects and the juicy slender roots of different vegetables, all of which tend to give its flesh that richness of flavor and juicy tenderness for which it is so deservedly renowned, it being equal to that of the woodcock. Many epicures eat up both snipe and woodcock with all their viscera, worms and insects to boot, the intestines, in fact, being considered the most savory parts. On opening some newly-killed snipe, I have more than once found fine large and well-fed ground-worms, and at times a leech, which I must acknowledge I never conceived suitable articles of food for man, and for this reason I have always taken good care to have both snipe and woodcocks well cleaned, as all game ought to be."

The food-materials found in viscera of twenty-five snipes examined by the author are as follows:

No.	Date.	Locality.	Food-Materials.
1	March 22, 1879.	Birmingham, Pa.	Water beetles and two seeds of smart-weed.*
2	March 22, 1879.	Birmingham, Pa.	Water beetles and three seeds of smart-weed.
3	March 22, 1879.	Birmingham, Pa.	Water beetles.
4	March 22, 1879.	Birmingham, Pa.	Water beetles.
5	March 22, 1879.	Birmingham, Pa.	Water beetles.
6	March 23, 1879.	Birmingham, Pa.	Beetles.
7	April 1, 1879.	West Chester, Pa.	Earth-worms and fragments of beetles.
8	April 2, 1879.	West Goshen, Pa.	Earth-worms.
9	April 2, 1879.	West Goshen, Pa.	Earth-worms.
10	April 2, 1879.	West Goshen, Pa.	Beetles and blades of grass.
11	April 2, 1879.	West Goshen, Pa.	Various insects.
12	April 7, 1879.	West Chester, Pa.	Beetles and two seeds of smart-weed.
13	April 12, 1879.	Chester county, Pa.	Vegetable matter apparently roots of small plant.
14	April 15, 1879.	East Bradford, Pa.	Beetles.
15	April 15, 1879.	East Bradford, Pa.	Beetles.
16	April 22, 1879.	East Bradford, Pa.	Portions of grass blades and roots.
17	April 1, 1884.	West Goshen, Pa.	Small seeds and earth-worms.
18	May 3, 1884.	East Bradford, Pa.	Beetles and earth-worms.
19	May 3, 1884.	East Bradford, Pa.	Beetles.
20	May 6, 1884.	East Bradford, Pa.	Beetles and earth-worms.
21	May 10, 1884.	East Bradford, Pa.	Various insects and vegetable matter.
22	April 17, 1883.	Chester county, Pa.	Small seeds.
23	April 17, 1883.	Chester county, Pa.	Small seeds and earth-worms.
24	April 17, 1883.	Chester county, Pa.	Vegetable matter.
25	April 17, 1883.	Chester county, Pa.	Small seeds.

* *Polygonum.*

Genus **MACRORHAMPHUS** Leach.

Macrorhamphus griseus (Gmel.).

Dowitcher.

Description.

Bill similar to Wilson's Snipe; wings rather long and pointed; about three-fourths of an inch of lower part of tibia bare; front toes with basal webs especially between the middle and outer; tail double-emarginate with twelve feathers; *Gallinago* usually has sixteen tail feathers; sexes alike, but plumage varies much with age and season. Although this bird has a general resemblance to Wilson's Snipe, it can easily be distinguished from it by basal webs of toes; or even when flying by the white markings of lower back.

1. Yellow-throated Vireo. 2. Blue-winged Warbler.
3. Great Horned Owl. Males.

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Adult.—Blackish-brown above, varied with reddish and grayish; rump white; tail and its upper coverts blackish, barred with white; lower parts rusty-red, paler or whitish on abdomen. Fall birds have upper parts and breast grayish and lower part of back and most of under parts white.

Habitat.—Eastern North America, breeding far north.

Rare spring and autumnal visitor. Specimens have been taken in Chester, Lancaster and Erie counties. This species, when found here, is seen singly or in pairs, and never in flocks such as are found about the Atlantic coast during migrations.

Genus **MICROPALAMA** Baird.

Micropalama himantopus (Bonap.).

Stilt Sandpiper.

Description.

Bill much as in *Gallinago* but shorter; less widened at end and less distinctly furrowed on top, sometimes perceptibly curved. Wings long, pointed, first primary longest; legs very long; tibiæ bare an inch; tarsus as long as bill; feet semi-palmate, the front toes being connected by two evident basal webs; sexes alike.—*From Coues' Key.*

"*Adult in summer.*—Above blackish, each feather edged and tipped with white and tawny or bay, which on scapulars becomes scolloped. Auriculars chestnut; a dusky line from bill to eye, and a slight superciliary one; upper tail-coverts white with dusky bars. Primaries dusky with blackish tips; tail feathers 12, ashy-gray, their edges and a central field white; under parts mixed reddish, black and whitish, in streaks on jugulum, elsewhere in bars; bill and feet greenish-black. Length 8½–9; extent 16–17 * * bill 1.50–1.70 * * * Young and adults in winter ashy-gray above, with or without traces of black and bay, the feathers usually with white edging; line over eye and under parts white, the jugulum and sides suffused with the color of the back, and streaked with dusky; legs usually pale greenish-yellow. The full breeding dress is of brief duration; the birds are usually ashy and white from September to April, both inclusive."—*Coues' Key.*

Habitat.—Eastern province of North America, breeding north of the United States, and migrating in winter to the West Indies and central South America.

Very rare spring and fall migrant. I have never met with this species in Pennsylvania. Dr. Walter Van Fleet has observed it in Clinton county and Mr. W. W. Stoey, of Harrisburg, mentions the Stilt Sandpiper as one of the occasional visitors found about the Susquehanna, in Dauphin county.

Genus **TRINGA** Linnæus.

Tringa canutus Linn.

Knot; Red-breasted Sandpiper; Ash-colored Sandpiper.

Description.

Bill straight, short, about 1½ inches long; both mandibles have grooves on sides; legs short and stout; toes short and stout, without any webs, but front toes have rather wide margins; hind toe rather long and slender; tail feathers about even.

Adult in spring.—Upper parts grayish-brown and many feathers have black centers with paler edges; rump and upper tail-coverts chiefly white with irregular bars or spots of black or brownish; streak over eye, chin, throat and breast rusty-red; belly, flanks and under tail-coverts white or nearly white; sides whitish with dusky streaks; bill and legs black, eyes brown. Birds both young and old, taken in autumn, have upper parts more grayish and less black, and lower parts generally white.

Habitat.—Nearly cosmopolitan; breeds in high northern latitudes, but visits the Southern Hemisphere during migrations.

The Robin-snipe or Gray-back, as the Knot is called by hunters on the Atlantic coast of New Jersey, where it is abundant during migrations, is a regular and somewhat common visitor about the lake shore and at Erie bay, in Erie county, during the spring and fall migrations. In other parts of the state the Knot is seldom seen.

Tringa maritima Brünn.

Purple Sandpiper.

Description.

Bill quite slender and straight or slightly curved down at end.

"*Winter dress.*—Back and scapulars sooty black, strongly glossed with purplish, the feathers bordered terminally with dark plumbeous-gray; jugulum uniform mouse-gray or brownish-plumbeous.

"*Young, first plumage.*—Scapulars, interscapulars and wing-coverts bordered with pale grayish-buff, with little or none of rusty; length about 9 inches; (extent about 16); bill about 1.20; tarsus about .99"—*B. B. & R. Birds of N. A.*

Habitat.—Northern portions of Northern Hemisphere, in North America chiefly the northeastern portions, breeding in the high north, migrating in winter to the eastern and middle states, the great lakes and the shores of the larger streams in the Mississippi valley.

This species I have never met with in Pennsylvania, where it occurs only as a very rare or casual migrant. Mr. George B. Sennett, of Erie city, mentions it as a straggler in his locality. The late Judge Libhart records in his report the capture of a Purple Sandpiper in August (year not given) in Lancaster county. A specimen in the U. S. National Museum was taken many years ago near Philadelphia.

Tringa maculata Vieill.

Pectoral Sandpiper; Grass-snipe; Jack-snipe.

Description (*Plate 66*).

Adult.—Length about 10 inches; extent about 18; bill little over an inch long and straight; bill (dried skin) blackish, paler toward base; legs dark greenish; eyes brown; upper parts, generally blackish-brown, feathers edged with reddish-brown and white or whitish; chin, upper part of throat and indistinct line over eye whitish; foreneck and upper part of breast ashy-gray (with sometimes a buff tinge) with numerous dusky streaks, rest of breast, belly, sides and crissum pure white.

Habitat.—The whole of North America, the West Indies and the greater part of South America; breeds in the Arctic regions. Of frequent occurrence in Europe.

Common spring and fall migrant, arriving, generally, in April. These birds, after rearing their young in the far north, return to their winter resorts and again make their appearance here in September, and they are often found with us in October and the early part of November. The Pectoral Sandpiper is found frequently in small flocks (sometimes in large flocks) or singly, and often in company with other species, particularly the Wilson's Snipe. The Grass-snipe as this species is best known to gunners, frequents the same localities as the Wilson's Snipe, but it is oftener seen about low, wet, grassy flats in open fields and meadows than about the shores of streams and ponds.

Tringa fuscicollis VIEILL.

White-rumped Sandpiper.

DESCRIPTION.

Length about 7½ inches; extent about 15; bill black at end, much lighter at base of lower mandible; iris brown; bill about an inch long. This bird although smaller is very similar to the Pectoral Sandpiper, from which it can be distinguished by the (usually) pure white upper tail-coverts; dusky streaks on foreneck and breast, chin and throat with small dusky specks.

Habitat.—Eastern province of North America, breeding in the high north. In winter, the West Indies, Central and South America, south to Falkland Islands. Occasional in Europe.

Very rare spring and fall migrant in Pennsylvania. One of these sandpipers was taken in Berks county, near Reading, by Mr. D. Frank Keller. I have seen two of these birds in the possession of Mr. C. D. Wood, which were captured, he said, along the Schuylkill, near Philadelphia. I have never met with the species in Pennsylvania.

Tringa minutilla VIEILL.

Least Sandpiper; Peep.

DESCRIPTION (*Plate 78*).

Smallest of all the sandpipers; length about 5½ inches; extent about 10½; bill, slender, straight and about ¾ of an inch long.

Adult spring dress.—Upper parts brownish-black, feathers with dark centers, edged with bright reddish or chestnut, and more or less tipped with white; foreneck and breast pale brownish-white with numerous dusky streaks; rest of under parts white. The adults and young in fall are quite similar, but with more white on chin and upper throat, and foreneck and breast is light-grayish with a few indistinct dusky streaks. This species can easily be distinguished from Semipalmated Sandpiper by not only its smaller size, but by the fact that its long slender front toes have no basal webs as in the Semipalmated.

Habitat.—The whole of North and South America, breeding north of the United States. Accidental in Europe.

The Least Sandpiper is a common spring and fall migrant in Pennsylvania. At Erie bay it is very abundant, being usually seen in large flocks, in company with the Semipalmated Sandpiper, and both species

are known there by the common name of "Peeps." This species is also found, often in considerable numbers, about streams and ponds in all parts of the state, but is generally more numerous in the interior in the fall than during the spring migration. Referring to these, the smallest of all our sandpipers, Nuttall says that "for the discovery of their food their flexible and sensitive awl-like bills are probed into the mire, marshy soil, or wet sand, in the manner of the snipe and woodcock, and in this way they discover and rout from their hidden retreats the larvæ and soft worms which form a principal part of their fare. At other times they also give chase to insects, and pursue their calling with amusing alacrity."

Tringa alpina pacifica (Coues.).

American Dunlin; Red-backed Sandpiper; Black-bellied Sandpiper

Description.

Bill and legs black, the former rather stout and slightly decurved. The bill is much longer than head (three specimens before me average 1.50); sexes alike. Like other sandpipers this species shows great variation in its colors with age and season, but adults in the spring may be known by the bright chestnut and blackish feathers (many with grayish or white tips), of upper parts, the black colored rump and upper tail-coverts, and a broad black patch on belly. The foreneck and upper part of breast grayish-white, streaked with dusky, rest of under parts white. The adults and young in fall dress have upper parts rather dark ashy-gray; rump and upper tail-coverts much darker (specimens are often seen with reddish and black feathers on back, and sometimes single feathers or patches of black on belly). Lower parts usually white; foreneck and breast grayish-white streaked with dusky. Length about 8½ or 9 inches; extent about 15; eyes brown.

Habitat.—North America in general, breeding far north.

Regular spring and fall migrant. The American Dunlin or Red-backed Sandpiper is much more numerous at Erie bay, and about the lake shore in Erie county, than in any other section of the state. When these birds are met with about the gravelly or muddy shores of our larger water courses—Susquehanna, Delaware, Allegheny and Ohio rivers chiefly—they generally are seen singly or in small flocks, usually in company with other species. At Erie, in the fall, the Dunlin is a very abundant bird, being found in flocks which often number a hundred or more. Large numbers of this species, and other shore birds, are killed by gunners in the fall (the principal flights occur usually in September) along the beach on the peninsula, and about the muddy flats at the mouth of Mill Creek, which flows into Erie bay, below the Soldiers' and Sailors' Home, at Erie city. The Dunlin feeds on worms, insects, small bivalve shells, etc., and when fat, is equally as palatable as the snipe or plover.

Belted Kingfisher.

1. Males; 2. Female.

GENUS **EREUNETES** ILLIGER.

Ereunetes pusillus (LINN.).

Semipalmated Sandpiper; Peep.

DESCRIPTION (*Plate 81*).

Size small, a little larger than *T. minutilla* from which in any plumage it can be recognized by the basal webs of front toes; bill and legs black; eyes brown.

Adult in spring.—Above grayish-brown, feathers more or less edged with brownish or rusty, and tipped with whitish; lower parts white, except jugulum which is pale grayish-brown, streaked with dusky. The old birds and young in the fall have upper parts more grayish (particularly about back of neck), and less rusty; lower parts white; jugulum (adult) very faintly streaked with dusky; jugulum (young) pale buff without streaks.

Habitat.—Eastern province of North America, breeding north of the United States; south in winter to the West Indies and South America.

Common spring and fall migrant, similar in habits, and occurring in the same localities as the Least Sandpiper.

GENUS **CALIDRIS** CUVIER.

Calidris arenaria (LINN.).

Sanderling.

DESCRIPTION.

Very similar in general character to the sandpipers, but *hind toe is absent*; bill, about as long as head, stout and straight, end somewhat thickened and expanded; toes short.

"*Adult in summer.*—Above, light rufous, broken by large spots of black, the feathers mostly tipped with whitish. Head, neck, throat and jugulum pale cinnamon-rufous, speckled below and streaked above with blackish.

"*Adult in winter.*—Above, very pale pearl-gray (the lesser wing-coverts darker anteriorly), relieved only by faint darker shaft-streaks of the feathers. Throat and jugulum pure white.

"*Adult in spring.*—Above, light grayish, with large black spots (streaks on the crown), here and there mixed with rufous; jugulum speckled with dusky on a white ground.

" *Young.*—Above, pale gray, spotted with black and whitish, the latter on tips of the feathers; jugulum immaculate white, faintly tinged with dull buff. 'Bill and feet black; iris brown'—(Aud.). Length about 7.75 to 8.00 inches" (extent about 15 inches).—*B. B. and R. N. A. Birds.*

Habitat.—Nearly cosmopolitan, breeding in the Arctic and subarctic regions, migrating, in America, south to Chili and Patagonia.

Common spring and fall migrant at Lake Erie, where it is often seen in flocks, frequently in company with the Piping Plover; much less common in the interior of the state, where, generally, only scattered birds are found, usually, about the shores of rivers, lakes and large ponds.

Genus **LIMOSA** Brisson.

Limosa fedoa (Linn.).

Marbled Godwit.

Description.

"Bill lengthened, * * * slender, and curving gently upwards; grooved to near tip; the tip not attenuated, but pointed; the lower almost as long as the upper. Culmen without any furrow. * * * A short basal membrane between the middle and outer toes; hind toe lengthened; tail short, even.

"*Sp. ch.*—Bill long, curved upwards; both mandibles grooved; wings long * * * legs long; tibia with its lower half naked; toes rather short. * * * Entire upper parts variegated with brownish-black and pale reddish, the former disposed in irregular and confluent bands, and the latter in spots and imperfect bands; in many specimens the black color predominating on the back, and the pale red on the rump and upper tail-coverts. Under parts pale rufous, with transverse lines of brownish-black on breasts and sides; under wing-coverts and axillars darker rufous * * * tail, light rufous, with transverse bars of brownish-black. Bill pale yellowish, red at base; brownish-black at end; legs ashy black. Length about 18 inches; bill 4 to 5; tarsus 3."—*B. B. of N. A.*

Habitat.—North America; breeding in the interior (Missouri region and northward), migrating in winter southward to Central America and Cuba.

The Marbled Godwit, or Marlin, is a rare and irregular spring and fall migrant in Pennsylvania. Mr. George B. Sennett informs me stragglers are occasionally taken in Crawford and Erie counties. A few specimens have also been captured in recent years in Lancaster, Philadelphia and Delaware counties.

Note.—The Hudsonian Godwit (*Limosa hœmastica* Linn.) is said to have been captured many years ago near Philadelphia by the late John Krider. I have never met with this bird in Pennsylvania. None of the naturalists or collectors whose lists of birds of Pennsylvania are before me make any reference to it.

Genus **TOTANUS** Bechstein.

Totanus melanoleucus (Gmel.).

Greater Yellow-legs: Greater Tell-tale; Greater Yellow-shanks.

Description (*Plate 81*).

Bill long, slender, and with deep grooves in front of nostrils; tibiæ mostly bare; the long and slender legs are yellow; bill and claws black; iris brown; the short and rounded tail is blackish with numerous transverse white bars; upper tail coverts white with few brownish bars; upper parts generally brownish-black (ashy on back of neck) with numerous white spots or edging on feathers; chin, upper throat, lower part of breast, abdomen, most of sides and under tail coverts white; lower neck in front and upper breast grayish-brown, with many dusky streaks. Length, bill to end of tail about 14 inches; extent about 25; bill about $2\frac{1}{4}$ inches, never under 2.

Habitat.—America in general, breeding in the cold temperate and subarctic portions of North America, and migrating south to Chili and Buenos Ayres.

Red-headed Woodpecker.

1. Male; 2. Female; 3. Young.

Common spring and fall migrant, but more numerous in the fall—from last of August to middle of October—than in spring. At Lake Erie this species is often seen in small flocks, but in other parts of the state it is mostly found singly or in pairs, inhabiting the same localities as the Lesser Tell-tale. The Greater Yellow-legs feeds sometimes, it is said, on small fish. A dozen or more of these birds which I have examined had in their stomach chiefly different kinds of insects, worms and small particles of shells.

Totanus flavipes (Gmel.).

Yellow-legs; Lesser Tell-tale; Yellow-shanks.

Description.

This bird is a miniature of the Greater Yellow-legs; colors the same. Length about 10 or 11 inches; extent about 19 or 21; bill never two inches long, and in three birds before me the bills average a trifle less than one and one-half inches.

Habitat.—America in general, breeding in the cold temperate and subarctic districts, and migrating south in winter to southern South America. Less common in the western than the eastern province of North America.

The Yellow-legs, commonly known along the sea-shore as "Little Yellow-leg-Tell-tale," is quite frequently found in Pennsylvania during migrations. Although often seen in spring, it is most numerous during the last of August and in September. At Erie bay this bird, also the Greater Yellow-legs, is quite common from the latter part of August until, some seasons, as late as the first week in November. It is generally found in the interior, singly or in pairs, and sometimes, though not often, in parties of five or six. I have often found them about ponds, pools, and muddy flats, never along streams of running water, unless the borders of such streams were muddy and destitute of grasses and other vegetation. Dr. Ezra Michener, in a list of the Chester county birds, published in 1863, says this species is a "frequent summer resident." I have never known this bird to occur in Chester county as a summer resident, and am satisfied that it is *now* found in Chester county and throughout Pennsylvania *only* as a spring and autumnal migrant.

The food-materials of thirteen of these birds examined by the writer are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	April 30, 1879,	Chester county, Pa.,	Insects, chiefly beetles.
2	May 7, 1879,	Chester county, Pa.,	Small "worms."
3	Aug. 27, 1879,	Assomack county, Va.,	Insects.
4	Aug. 27, 1879,	Assomack county, Va.,	Insects.
5	Aug. 27, 1879,	Assomack county, Va.,	Insects.
6	Sept. —, 1882,	Brigantine, N. J.,	Small "worms."
7	Sept. —, 1882,	Brigantine, N. J.,	Small "worms."
8	Sept. —, 1882,	Brigantine, N. J.,	Beetles.
9	Aug. 30, 1882,	Chester county, Pa.,	Insects.
10	Oct. 10, 1880,	Chester county, Pa.,	Beetles and "worms."
11	Oct. 10, 1880,	Chester county, Pa.,	Insects and fragments of shells.
12	Oct. 10, 1880,	Chester county, Pa.,	Insects.
13	Oct. 10, 1880,	Chester county, Pa.,	Insects

Totanus solitarius (Wils.).

Solitary Sandpiper.

Description (*Plate 10*).

Bill long, straight, slender; maxilla with deep grooves in front of nostrils; slender legs and toes; basal webs, but that between outer and middle toes much the largest; tail rounded and barred with white and blackish; bill blackish; legs greenish; eyes brown.

Adult, in spring.—Upper parts dark-brown, with faint tinge of olive; top of head, and back of neck streaked with white, rest of upper plumage spotted with white; chin, lower breast, most of sides, abdomen and under tail-coverts white; front of neck white with numerous dusky streaks; primaries blackish above, paler below; lining of wings and axillars with dusky and white bars. Old birds in the fall and the young are very similar to the adult in spring but are duller in color; the top of head, hind neck and most of sides of the latter grayish-brown with few or no faint dusky streaks; chin and upper throat white; front of neck grayish-brown and white with indistinct dusky streaks. Length 8 to 9 inches; extent 15 to 17; bill 1¼ inches or a little less.

Habitat.—North America, breeding occasionally in the northern United States, more commonly northward, and migrating southward as far as Brazil and Peru.

Common spring and fall migrant. Breeds occasionally in a few localities. The Solitary Sandpiper, unlike other of the sandpipers occurring in this region, appears to have a special fondness for stagnant pools in and about the woods. During its spring and fall passage through Pennsylvania it is common, frequenting, generally, the muddy borders of ponds, pools and sloughs. This species seldom arrives in this state before April 25. About the first week in May you find them singly, in pairs, and occasionally in flocks, numbering sometimes as many as eight or even twelve individuals. In Wilson's Ornithology, the following mention is made of the species: "I have made many long and close searches for the nest of this bird without success. They regularly breed on Pocono mountain, between Easton and Wilkes-Barre, in Pennsylvania, arriving there early in May and departing in September." In Cumberland county the Messrs. Baird record it as a native. Wilson also states that these birds inhabit the watery solitudes of our highest mountains during the summer from Kentucky to New York, but are nowhere numerous, seldom more than one or two being seen together. Dr. Coues has found "young birds in July in northern Dakota, about the pools of Turtle mountain." The same writer also states that "in Maryland and Virginia, and in nearly correspondent latitudes in the west, I have shot birds in August so young as to leave no doubt in my mind that they were bred in the vicinity." I have never seen a Solitary Sandpiper in Pennsylvania in June or July, but that it breeds sparingly, and in several localities, there is no doubt. Mr. George B. Sennett, of Erie, has several times met with this species in midsummer about streams running through woods, in the vicinity of Meadville, Crawford county; and Mr. H. C. Kirkpatrick, a taxidermist residing at Meadville, says it is occasionally found in that neighborhood as a native. Prof. H. Justin

Roddy, of Millersville, Pa., writing (letter) of this species in Perry county, says: "In the latter part of June, 1884, I shot an adult male Solitary Sandpiper. There were a pair of them in a swamp, and from their actions they were nesting. I devoted a good bit of time in searching for their nest but could not find it. I have no doubt, however, as to their breeding." Dr. Treichler, of Lancaster county, mentions it as an irregular breeder; he has found young about half grown in the Conewago meadows early in July. Dr. Walter Van Fleet, of Renovo, states that the Solitary Sandpiper breeds in Clinton, Union and Northumberland counties. Prof. A. Kock, of Williamsport, tells me that he is quite positive that this bird sometimes breeds in the mountainous regions of Lycoming county. Although the bird is common, very little is known concerning its nest or eggs. Prof. Robert Ridgway * says, "Egg (identification doubtful, but probably correct) 1.32 by .90, dull light-buffy, thickly spotted and clouded with rich madder-brown and purplish-gray." Mr. Oliver Davie (*Nests and Eggs of N. A. Birds, third edition*), says: "In the last edition of this work I mentioned an egg supposed to belong to this species, which I took in an open field bordering the Scioto river, near Columbus, Ohio, in the latter part of May, 1887. * * * * The egg was of a pointed oval shape, and not nearly so pyriform as are the eggs of most of this family, size 1.25 by .88, smaller than the eggs of the Spotted Sandpiper. The ground was clay-color with a reddish tinge, thickly marked with reddish and blackish-brown. The nest was on the ground in as exposed a locality as is ever frequented by this bird. It contained two eggs, both far advanced in incubation, only one of which was preserved."

According to Audubon, the Solitary Sandpiper is expert in catching insects on the wing, "especially the smaller kinds of dragon-flies, which it chases from the sticks on which they alight, and generally seize before they have flown across the little ponds which are the favorite places of resort of this species. I have found their stomachs filled with aquatic insects, caterpillars of various kinds, and black spiders of considerable size."

The food materials of eleven birds examined by the writer are given below:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	May 5, 1880.	Chester county, Pa..	Small shells.
2	May 6, 1880.	Chester county, Pa..	Vegetable matter.
3	May 9, 1880.	Chester county, Pa..	Small "worms."
4	May 7, 1882.	Chester county, Pa..	"Worms" and beetles.
5	May 7, 1882.	Chester county, Pa..	"Worms" and beetles.
6	Sept. 21, 1883.	Chester county, Pa..	Beetles
7	Oct. 5, 1883.	Chester county, Pa..	"Worms."
8	Oct. 20, 1883.	Schuylkill county, Pa..	Insects.
9	May 11, 1884.	Chester county, Pa..	Beetles and earth-worm
10	May 11, 1884.	Chester county, Pa..	Dipterous insects.
11	May 11, 1884.	Chester county, Pa..	Small "worms."

* Manual of North American Birds, page 166.

Genus **SYMPHEMIA** Rafinesque.

Symphemia semipalmata (Gmel.).

Willet.

Description.

Size large, bill long, thick and grooved to middle; legs stout and long; lower half of tibiæ bare; toes short and stout with marginal membranes and basal webs connecting inner and outer with the middle toes; tail feathers nearly even. This species varies more or less with age and season. Three specimens, male and females, (taken in August), before me have bluish black legs, blackish bills, the latter $2\frac{1}{2}$ and $2\frac{3}{4}$ inches long. Upper parts brownish-gray, darkest on head and back, streaked with dusky, and many of the feathers with whitish edges; back of neck ashy-gray; foreneck, the sides and portion of breast grayish, with dusky streaks or spots; chin upper part of throat, breast, except on sides, belly and crissum white; axillars, lining of wings, primary coverts and ends of primaries black; most of the upper tail-coverts, most of the secondaries and a large space on primaries, white; tail ashy-white with fine dusky markings. Length about 16 inches; extent about 28.

Habitat.—Temperate North America, south to the West Indies and Brazil.

Rare and irregular spring and fall migrant in eastern Pennsylvania, and when observed here is, usually, seen late in August. Mr. Sennett, and the Messrs. Thompson, of Erie city, have never known the Willet to visit that locality; and none of the naturalists and collectors, whose reports are before me, have observed this species in any of the central, northern or western counties of the state. I have two specimens, one taken in Delaware county (August, 1885), the other was killed by flying against a telegraph wire along the Brandywine, in Chester county (August, 1887). Dr. Detwiller, of Bethlehem, has secured specimens (mostly "after severe fall equinoctial storms" about the Delaware and Lehigh rivers. Mr. W. H. Buller, Lancaster county, says: "The Willet has, occasionally, been killed on the gravel bars along the Susquehanna river; the last one, to my knowledge, was captured in the autumn of 1878."

The Willet subsists, mainly, according to different writers, on worms, various aquatic insects, small crabs, minute shell fish, small shells, etc.

Genus **BARTRAMIA** Lesson.

Bartramia longicauda (Bechst.).

Bartramian Sandpiper; Grass Plover; Field Plover; Upland Plover.

Description (*Plate 68*).

Bill about as long as head and nearly straight; upper mandible with long grooves on sides in front of nostrils; neck, legs and tail long; lower part of tibiæ naked; legs rather slender; toes, especially the hind one, rather long and slender, outer toe and middle joined by small basal web; sexes alike; no marked seasonal changes in plumage. Upper parts mostly brownish-black, most of the feathers with tawny and whitish edgings; top of head and back darkest; crown divided by a narrow buff line; lower part of back and rump plain brownish-black; chin and upper throat white; neck and breast faint yellowish or whitish with numerous streaks and spots of dusky; lower part of breast, abdomen and crissum white; axillars and lining of wings, barred with black and white; wing quills black and brown, with white bars on inner webs; middle tail feathers darkest, others pale-buff with bars, spots or

Flicker.

1. Male; 2. Female.

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stripes of white and black; tip and top of bill blackish, rest yellowish; legs yellow; eyes brown; length about 12½ inches; extent about 23.

Habitat.—Eastern North America, north to Nova Scotia and Alaska, breeding throughout its North American range; migrating in winter southward as far even as southern South America. Occasional in Europe.

This bird, known to sportsmen as the Field or Grass Plover, is a common migrant and summer resident in Pennsylvania from about the 20th of April until September. This species resides during the breeding season in grass fields and highlands. In this particular it differs from others of its family. Often in the summer these birds alight on fences along the roadside, in trees, etc., and raise their long wings to their full extent. When breeding these birds are found singly or in pairs, and they are then quite unsuspicious, often allowing a very near approach before they take to wing or run off and hide in the grass, but in the late summer when assembled in flocks they become exceedingly shy and difficult of approach. Many gunners who shoot every season, in August, large numbers of these delicious game birds, generally go on horseback or in wagons in order to get within easy range of their fleet-footed, swift-winged and wary game. Nests on the ground, the spotted eggs, three to four, measure a little over 1⅓ inches long by a trifle more than 1¼ inches broad. Its ordinary note is a rather loud yet soft and pleasing whistle, but when breeding it frequently utters a loud, prolonged and tremulous piercing scream, which, when heard at considerable distance, sounds very much like the sudden cry of a child in great distress. Late in July and in August, or when the young are amply able to provide for themselves, the plovers collect in flocks of six, eight a dozen, or twenty, and sometimes many more, and frequent grass fields and meadows, particularly where grasshoppers, which are one of their favorite articles of food, are abundant.

By the last of September but few of the species are found in the interior, as they appear to soon leave the breeding grounds and migrate towards the seacoast and large tide rivers.

In addition to feeding on different forms of insect-life, especially beetles and grasshoppers, the plover often eats various kinds of berries and seeds. Fourteen of these birds, which I have examined, were found to have fed on the following-named insects, etc.:

No.	Date.	Locality.	Food-Materials.
1	July —, 1879,	Willistown, Pa.,	Beetles.*
2	July —, 1879,	Willistown, Pa.,	Various insects.*
3	July —, 1879,	Willistown, Pa.,	Grasshoppers.*
4	June 6, 1880,	Honeybrook, Pa.,	Beetles.
5	June 6, 1880,	Honeybrook, Pa.,	Beetles.
6	Sept. 15, 1880,	Philadelphia Market, Pa.,	Small "worms."
7	Sept. 15, 1880,	Philadelphia Market, Pa.,	Beetles.
8	Aug. 20, 1883,	Chester county, Pa.,	Grasshoppers and small seeds.
9	Aug. 20, 1883,	Chester county, Pa.,	Grasshoppers.
10	Aug. 20, 1883,	Chester county, Pa.,	Grasshoppers.
11	Aug. 20, 1883,	Chester county, Pa.,	Grasshoppers and fragments of beetles.
12	Aug. 14, 1884,	Chester county, Pa.,	Grasshoppers.
13	Aug. 14, 1884,	Chester county, Pa.,	Dipterous insects.
14	Aug. 14, 1884,	Chester county, Pa.,	Small seeds and grasshoppers.

* Young birds.

Genus ACTITIS Illiger.

Actitis macularia (Linn.).

Spotted Sandpiper; Tilt-up.

Description (*Plate 81*).

Bill straight, slender and a little longer than head; mandibles grooved; lower third of tibiæ bare; legs rather long; toes long, the outer and middle have basal web. Size small; sexes alike; adults in winter and young very similar.

Adult.—Length about 7½ inches; extent about 13½; bill pale yellow, with black tip; eyes brown; legs pale flesh color. Upper parts grayish or brownish olive with greenish or bronzy lustre and irregular spots, streaks, and lines of blackish; white streak over eye; lower parts white with numerous rounded black spots. The young and adults in winter have less metallic lustre on upper parts, and under parts are white or nearly white.

Habitat.—North and South America, south to Brazil. Breeds throughout temperate North America. Occasional in Europe.

The Tilt-up, as this sandpiper is universally known in this section, arrives in Pennsylvania about the middle of April, sometimes even earlier. It is common and indigenous. The nest is placed on the ground in a grass field, sometimes in a grain field, or on the sandy bank near streams and ponds, along which these birds are commonly found industriously seeking their hidden prey. The creamy or buff colored eggs, from two to five in number, are spotted and blotched with different shades of brown and black. This bird, like other of the waders, places its eggs in the nest with the small ends together. Wilson very properly says: "This species is as remarkable for perpetually wagging the tail as some others are for nodding the head; for, whether running on the ground, or on fences, along the rails, or in the water, this motion seems continual; even the young, soon after they are freed from the shell, run about constantly wagging the tail." When you approach the eggs or young the old birds manifest great concern. They flutter along the ground as if injured, and should you follow and attempt to catch them they will lead you to a considerable distance from their treasures before flying off. Wilson mentions the following instance, which shows the great solicitude which the female has for her young: "My venerable friend, Mr. William Barton, informs me that he saw one of these birds defend her young for a considerable time from the repeated attacks of a ground-squirrel. The scene of action was on the river shore. The parent had thrown herself, with her two young behind her, between them and the land, and at every attempt of the squirrel to seize them by a circuitous sweep, raised both her wings in an almost perpendicular position, assuming the most formidable appearance she was capable of, and rushed forwards on the squirrel, who, intimidated by her boldness and manner, instantly retreated; but presently returning, was met, as before, in front and on flank by the daring and affectionate bird, who, with her wings

and whole plumage bristling up, seemed swelled to twice her usual size. The young crowded together behind her, apparently sensible of their perilous situation, moving backwards and forwards as she advanced or retreated. This interesting scene lasted for at least ten minutes; the strength of the poor parent began evidently to flag, and the attacks of the squirrel became more daring and frequent, when my good friend, like one of those celestial agents who, in Homer's time, so often decided the palm of victory, stepped forward from his retreat, drove the assailant back to his hole, and rescued the innocent from destruction." To escape capture when wounded the Tilt-up will resort to many devices. One day when out shooting along Beaver creek, a tributary of the Brandywine, about two miles from West Chester, I crippled one of these birds; it fell to the ground and ran rapidly to the edge of the stream, which at this point was probably ten feet wide. The water was about a foot deep, perfectly clear, and, except on one side for about eighteen inches, was dammed back and remained quite motionless. I approached the bird, when, to my great surprise, it plunged into the water and went down to the sandy bottom like a stone. It ran on the bottom seemingly without any difficulty, and even through the swiftly running water along the edge, came up on the opposite side of the stream and thrust its head into some long grass, but kept its body submerged. The bird repeated this performance three times before I secured it. The Tilt-up is not gregarious.

The Spotted Sandpiper is also known by many as Peet-weet, a name given in imitation of its rather shrill cry. This species feeds almost exclusively on insects, such as beetles, flies, grasshoppers, larvæ, worms, etc.

GENUS **NUMENIUS** BRISSON.

Numenius longirostris WILSON.

Long-billed Curlew; Sickle-bill.

DESCRIPTION.

"The largest American species of this genus; bill very long, much curved; upper mandible longer than the under, somewhat knobbed at the tip; wing rather long; legs moderate; toes united at base; entire upper parts pale-rufous, tinged with ashy; every feather with transverse and confluent bands of brownish-black, most numerous and predominating on the back and scapulars; secondary quills, under wing-coverts, and axillaries, bright rufous; primaries with their outer webs brownish-black, and their inner webs rufous, with transverse bands of black; under parts pale-rufous, with longitudinal lines of black on the neck and sides; tail rufous, tinged with ashy, transversely barred with brownish-black; bill brownish-black; base of under mandible reddish-yellow; legs bluish-brown; specimens vary to some extent in the shade of the rufous color of the plumage, and very much in the length of the bill; the rufous color is probably more distinct in the young. Length about 25 inches (extent about 38); tail 4; bill 5 to 8; tarsus 2¼ inches."—*B. B. of N. A.*

Habitat.—Temperate North America, migrating south to Guatemala and the West Indies. Breeds in the South Atlantic states, and in the interior, through most of its North American range.

I have never met with the Long-billed Curlew in Pennsylvania, where it occurs only as a rare and irregular migrant, in the spring and fall. The late Judge Libhart, in his report, mentions this species as a rare visitor in Lancaster county. Mr. D. F. Keller, of Reading, says it has been taken in Berks county, and Mr. Thomas S. Gillin, of Ambler, has observed it as an occasional visitor in Montgomery county. Dr. Coues (*Birds of the Northwest*) says: "Unlike our other two species of curlew, the Long-billed is perfectly at home in most parts of the United States, rearing its young even down on our southern border. Its northern range is restricted, apparently, by the region of the Saskatchewan, as intimated by Richardson, and the length of the British Provinces adjoining the United States. I was, however, assured of its occurrence in Labrador, though I did not see it myself. In New England it appears to be rather uncommon, according to all accounts. * * * I found it resident on the North Carolina coast, where it undoubtedly breeds. I found it breeding with Godwits and Bartramian Tattlers on the prairies of Minnesota and eastern Dakota, and likewise observed it in June, apparently breeding, in New Mexico, near Fort Wingate, just west of the Rio Grande. * * * It is by no means confined to the vicinity of the water, but, on the contrary, is often seen on extensive dry plains, where it feeds on various molluscs, insects and berries, which it deftly secures with its extraordinarily long bill. The length and curve of this member, gives the bird a singular and unmistakable appearance, either in flight or when gathering its food. Its voice is sonorous and not at all musical."

Numenius borealis (Forst.).

Eskimo Curlew; Dough-bird.

Description.

"Much smaller than the preceding; bill rather longer than the head, slender; wings long; tail short; legs moderate; entire upper parts brownish-black, spotted with dull yellowish-rufous; quills brownish-black, uniform on both webs, without bars on either; under wing-coverts and axillaries light-rufous, with transverse stripes of brownish-black; under parts dull-white, tinged with rufous, with longitudinal narrow stripes of brownish-black on the neck and breast, and transverse stripes of the same on the sides and under tail-coverts; tail ashy-brown, with transverse bands of brownish-black; bill brownish-black; base of under mandible yellow; legs greenish-brown; iris dark-brown. Length about 13½ inches; (extent about 28); bill 2¼ to 2½; tarsus 1¾."—*B. B. of N. A.*

Habitat.—Eastern Province of North America, breeding in the Arctic regions, and migrate south to South America.

Rare spring and fall migrant. A few of these birds are seen every year about the shores of Erie bay, where, in October, 1889, two were shot by Mr. James Thompson, of Erie city.

FAMILY **CHARADRIIDÆ.** PLOVERS.

THE PLOVERS.

About a dozen species and two or three varieties of this large and important family, containing, it is said, nearly a hundred species of all parts of the world, are recorded as occurring in North America. In the eastern United States six species are of regular occurrence. One—the Killdeers—breeds in Pennsylvania; the others which visit here, are found only as migrants in the spring and fall. Species which occur in this state frequent mostly the gravelly and sandy shores of rivers, large creeks and lakes, or the muddy banks of ponds; some, however, are often observed about plowed grounds, and in grass or stubble fields quite remote from water. They feed largely on an animal diet, consisting chiefly of beetles, grasshoppers, "worms," larvæ, fresh-water shells, etc.; and some, also, occasionally, eat small seeds and berries. At times, other than when breeding, Plovers are gregarious, and are often found, during migrations, in company with different species of the Shore Birds. These birds are strong and swift flyers. They run with great rapidity and when migrating some often fly at a considerable elevation. The Killdeers, and perhaps all, migrate at night. The spotted and pyriform eggs, usually four in number, are placed in a rude nest, or, commonly, in a slight depression in the bare ground. The eggs, like those of the Spotted Sandpiper, lay in the nests with the small or pointed ends together. Plovers have rather heavy and plump bodies, large, rounded heads, short, thick necks, and only three toes, except in *squatarola*, which has a very small rudimentary hind toe. The legs and toes are rather short and stout; the toes have basal webs. The bill, somewhat like that of a pigeon's in shape, is short and stout. The sexes are quite similar, but the changes with age and season are very marked.

GENUS **CHARADRIUS** LINNÆUS.

Charadrius squatarola (LINN.).

Black-bellied Plover; Bull-head Plover; Whistling Field Plover.

DESCRIPTION.

Very small, but distinct, hind toe.

Adult, breeding dress.—(Rarely seen in the U. S.); bill, legs, lores, chin, throat and front of neck, breast, except sides, most of abdomen and axillars black; upper parts spotted with blackish and whitish; forehead, line over eye, sides of neck, sides of breast, tibiæ, posterior part of abdomen, under tail-coverts and some of upper tail-coverts white.

Adults and young, fall.—Lower parts white, but axillars blackish; upper parts blackish, with grayish spots; legs dull bluish; young have upper parts speckled with pale golden-yellow. Specimens are often taken in the fall with single or large patches of black feathers on lower parts. Length about 12 inches; extent about 23; bill about 1.10.

Habitat.—Nearly cosmopolitan, but chiefly in the Northern Hemisphere, breeding far north, and migrating south in winter; in America to the West Indies, Brazil and New Grenada.

Rather rare spring and fall migrant; when found here is mostly seen in the autumn, when it is oftener met with in the vicinity of Lake Erie than elsewhere in the state. Generally seen singly, in pairs or small parties, never, according to my observation, in large flocks like the Golden Plover. I have taken two specimens in Chester county; Dr.

Detwiller has observed this species in Lehigh and Northampton counties as a rare visitant, and Mr. Thomas S. Gillin reports it to be an irregular migrant in Montgomery county. This plover has also been noted either as a straggler or irregular migrant in other parts of the state by the following gentlemen: Dr. Van Fleet, Clinton county; H. A. Tingley, M. D., Susquehanna county; D. F. Keller, Berks county; George Spencer Morris, Philadelphia county and W. H. Buller, Lancaster county. The Black-bellied Plover is mentioned by Audubon, Wilson and other writers as breeding in Pennsylvania. It does not now breed in this state, but retires to the dreary Arctic regions to rear its young. This species feeds on beetles, grasshoppers, worms, etc.; also, occasionally, on different kinds of seeds and berries.

Charadrius dominicus Müll.

American Golden Plover; Field Plover; Bull-head Plover.

Description (*Plate 82*).

This bird, very similar to *C. squatarola*, can easily be recognized by the absence of the hind toe and the grayish or *white* axillars; the dusky or blackish upper parts are usually more brightly spotted with golden-yellow.

Habitat.—Arctic America, migrating southward throughout North and South America to Patagonia.

The Golden Plover is said to be a rather common and regular migrant in the vicinity of Lake Erie, especially in the fall, when, frequently, large numbers of these birds are shot in the meadows and fields about Erie city. This bird is found generally throughout the commonwealth, but is very irregular in its visitations, except in the region about the great lake to the north of Erie county.

I have never seen the Golden Plover in eastern Pennsylvania during the spring migrations, and as an autumnal visitant it is uncertain. For several consecutive seasons none will be observed in certain districts; the following season, however, the birds will be found abundantly in these same districts. The largest flight of Golden Plovers that I ever saw in this section (Chester county) was in the fall of 1880, when flocks of from fifty to one hundred were quite plentiful about the plowed grounds and grass fields in the neighborhood of West Chester. Mr. Francis Jacobs, of West Chester, informs me that about the year 1860 Bull-head* Plovers were abundant in the Great Valley and in the vicinity of West Chester, where, in September, they came in flocks of hundreds and literally covered the fields where wheat had been sown. "In those days the wheat was sown, as but few farmers had drills." Mr. Jacobs states that he has often killed fifteen or twenty at one shot, and, in company with his brother, has shot two hundred or more in one day.

* *The name Bull-head is given to both the Golden and Black-bellied Plovers.* I suppose the birds mentioned by my friend Mr. Jacobs to have been Golden Plovers (*Charadrius dominicus*).

1. Night-Hawk. 2. Whip-poor-will.

Males.

These birds would remain about two weeks, or until the wheat had sprouted. They subsisted almost exclusively on wheat. My informant states that prior to 1860, for at least fifteen years, these birds annually, in the fall, made these visits, and that he had always been told, when a boy, that "Bull-heads" were abundant every year.

Audubon furnishes the following information of this species: "While searching for food on the sand or mud bars of the seashore they move in a direct manner, often look sideways toward the ground, and pick up the object of their search by a peculiar bending movement of the body. They are frequently observed to pat the moist earth with their feet to force worms from their burrows. In autumn they betake themselves to the higher grounds, where berries as well as insects are to be met with, and where they find abundance of grasshoppers."

Five of these plovers taken in September and October, 1880, in Chester county, had fed chiefly on grasshoppers and beetles; one had in its stomach a few small brownish seeds, with several large beetles, and another had its stomach gorged with grasshoppers with which were a few small black-colored worms.

GENUS ÆGIALITIS BOIE.

ægialitis vocifera (LINN.).

Killdeer.

DESCRIPTION (*Plate 11*).

Upper parts grayish-brown; rump and upper tail-coverts brownish-orange or rusty; forehead and under parts white, except two black bands across chest; bill black; iris dark-brown; legs grayish or dull greenish-yellow; eyelids scarlet. Length about 9 or 10 inches; extent about 20; tail rounded and about 3½ inches long; bill less than an inch long.

Habitat.—Temperate North America, migrating in winter to the West Indies and central and northern South America.

Reader, I am sure you can always distinguish this bird by the well-known cry which gives rise to its common name. Should you, however, have the lifeless body of one of these birds, you can without any difficulty distinguish it from other of its numerous relatives by the red eyelids and long legs. In addition you will also see a white line, with black margin, extending over the bill, between the eyes. The white feathers of the throat are continuous, with a conspicuous and immaculate collar, below which is a ring of black, separated by a streak of white from a band of black across the breast.

During the spring, summer and autumn the Kildeer is common in nearly all parts of Pennsylvania, and in winter it is quite frequently observed, particularly in the southern parts of the state. The spotted pyriform eggs, usually four in number, are placed in a slight hollow in the ground, oftentimes near a hill of corn.

The eggs, small at one end and quite pointed, measure about 1.50 inches long by about 1.08 broad.

"The food of this species consists of earth-worms, grasshoppers, crickets and coleopterous insects, as well as small crustacea, whether of salt or fresh water, and snails. Now and then they may be seen thrusting their bills into the mud in search of some other food. During autumn they run about the old fields and catch an insect which the bluebird has been watching with anxious care from the top of a withering mullein stalk. They run briskly after the plowman to pick up the worms that have been turned out of their burrows. Now standing on the grassy meadow, after a shower, you see them patting the moist ground, to force out its inhabitants. During winter you meet with them on elevated ground, or along the margins of the rivers; but wherever you observe one about to pick up its food you clearly see its body moving in a see-saw manner on the joints of the legs, until the former being so placed that the bill can reach the ground, the object is seized, and the usual horizontal position is resumed."—*Audubon.*

The food-materials, with date of collection and locality, of eleven Killdeers examined by the writer, are given below:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	April 10, 1879.	Chester county, Pa.,	Snails and beetles.
2	April 30, 1879.	Chester county, Pa.,	Earth-worms.
3	June 18, 1879.	Chester county, Pa.,	Beetles.
4	Nov. 14, 1879.	Lancaster county, Pa.,	Fragments of fresh water shells.
5	May 15, 1880,	Chester county, Pa.,	Earth-worms.
6	May 15, 1880,	Chester county, Pa.,	Earth-worms and larvæ.
7	Aug. 21, 1880.	Delaware county, Pa.,	Grasshoppers and small seeds.
8	Dec. 13, 1881.	Chester county, Pa.,	Grasshoppers.
9	July 31, 1883.	Chester county, Pa.,	Beetles and larvæ.
10	July 31, 1883.	Chester county, Pa.,	Beetles.
11	Sept. 20, 1884.	Chester county, Pa.,	Grasshoppers and seeds.

Ægialitis semipalmata BONAP.

Semipalmated Plover; Ring-neck; Ring Plover.

DESCRIPTION.

"Small; wings long, toes connected at base, especially the outer to the middle toe; forehead, throat, ring around neck (behind) and entire under parts white; a band of deep black across the breast, extending around the back of neck below the white ring. Band from the base of bill under the eye, and wider frontal band above the white band black; upper parts ashy brown; quills brownish-black with their shafts white in a middle portion; * * * * shorter tertiaries edged with white; greater coverts tipped with white; middle feathers of the tail ashy-brown, with a wide subterminal band of brownish-black, and narrowly tipped with white; two outer tail-feathers white, others intermediate, like the middle, but widely tipped with white; bill orange-yellow at base, black terminally; legs pale flesh color.

"*Female* similar, but rather lighter colored.

"*Young* with the black replaced by ashy-brown, the feathers of the upper parts bordered with paler (bill almost entirely black). Total length about 7 inches; (extent about 15,) bill 45. to .50; tarsus .95."—*B. B. and R. B. of N. A.*

Habitat.—Arctic and subarctic America, migrating south throughout tropical America, as far as Brazil and Peru.

The Semipalmated Plover is a rather common migrant (especially in the fall) about the lake shore and bay, in Erie county, where small flocks often in company with Piping Plovers and the small sandpipers, are seen. The Ringneck, as it is called by some, also occurs more or less frequently, usually singly or in pairs, and sometimes in small flocks with other species, particularly during the fall migrations along the shores of our principal rivers. The Ring Plover arrives in the Erie region early in May, and after breeding north of the United States, returns again in August, and remains until late in September. This little plover can easily be recognized from the next by the extent of the web, which extends to the second joint between the outer and middle toes. This species, according to different writers, feeds on insects, worms, small crustacea, mollusca and the eggs of fish and other marine animals.

Ægialitis meloda (Ord.).

Piping Plover.

DESCRIPTION.

"About the size of *Æ. semipalmata*; bill short; strong.

"*Adult male.*—Forehead, ring around back of neck, and entire under parts, white; a band of black in front above the band of white; band encircling the neck before and behind, but usually interrupted in the middle of breast, black, immediately below the ring of white on the neck behind. Head above and upper parts of body light brownish cinereous; rump and upper tail-coverts lighter, and often white; quills dark brown, with a large portion of their inner webs and shafts white; shorter primaries with a large portion of their outer webs white; tail at base white, and with the outer feathers white; middle feathers with a wide sub-terminal band of brownish-black, and tipped with white. Bill orange at base, tipped with black; legs orange yellow.

"*Female* similar to male, but with the dark colors brighter and less in extent.

"*Young.*—No black band in front; collar around the back of the neck ashy-brown."
—*B. B. and R. B. of N. A.*

Habitat.—Eastern province of North America, breeding from the coast of Virginia (at least formerly) northward; in winter, West Indies.

The Piping Plover, an abundant summer resident on the Atlantic coast of the United States, breeding, it is said, from the Carolinas northward to the Gulf of St. Lawrence, is found in the same localities in Pennsylvania as its near relative, the Semipalmated Plover. During migrations the Piping Plover, so called because of rather soft, musical and plaintive note, is about as plentiful in the Lake Erie region as the Semipalmated, but elsewhere in our state it appears to be quite a rare and irregular visitor. I have never met with this bird in any part of Pennsylvania except at Erie bay. The late Judge Libhart found it in autumn along the Susquehanna, in Lancaster county, where it has, also, recently

been observed by Dr. Treichler, of Elizabethtown. Stragglers have been taken in the fall, after severe storms from the Atlantic coast, when feeding along the shoals and shores of the Delaware and Lehigh rivers, by Dr. John W. Detwiller, of Northampton county, and Mr. T. L. Neff has found it in Cumberland county. The food of the Piping Plover is similar to that of previously mentioned species.

Ægialitis wilsonia (Ord.).

Wilson's Plover.

DESCRIPTION.

"Bill large and stout, longer than middle toe.

"*Adult male.*—Frontal crescent, extending back on each side of the crown to beyond the eye, ends of greater wing-coverts, shafts of primaries, and entire lower parts, pure white; crescentric patch covering fore part of the crown, lores, and wide band across the jugulum, black; occiput more or less strongly suffused with oceraceous, especially laterally and posteriorly. Upper parts (except as described) uniform brownish gray, the remiges (*i. e.* long wing feathers) darker.

"*Adult female.*—Similar to the male, but the black replaced by brownish gray, the jugular collar tinged with oceraceous. (The young very similar to female.) Bill black; eyelids grayish; iris brown; legs and feet pale grayish flesh color. Total length about 7.75; extent 16.00; culmen .80; tarsus 1.25; middle toe .75."—*B. B. and R. B. of N. A.*

Habitat.—Coasts of North and South America, from Long Island and Lower California southward to Brazil and Peru, including the West Indies. Casual to Nova Scotia.

Wilson's Plover may readily be recognized from either of the two species last mentioned, by the rather large head, black, large and heavy bill. This species breeds in New Jersey and along the seacoast of some, perhaps all, of the south Atlantic states, where, as well as about the coasts of the gulf states, it is common, often being found, when migrating, in small flocks. I have never found this plover in Pennsylvania, nor has it ever been seen about Lake Erie by Mr. George B. Sennett. The late Judge Libhart, in his ornithological report of Lancaster county, says Wilson's Plover is "frequent on the beach (Susquehanna) in autumn." A few stragglers have been captured about some of our larger rivers during migrations, and reported to me as follows: James Galen and Dr. A. C. Treichler, both of Lancaster county; Hon. Gerard C. Brown, York county; W. W. Stoey, Dauphin county; Dr. John W. Detwiller, Northampton county, and Mr. T. L. Neff, of Carlisle, Cumberland county. Their food is said to consist almost entirely of minute shellfish, worms and small insects.

Tyrant Flycatcher, or King Bird.

1. Male; 2. Female.

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FAMILY APHRIZIDÆ. TURNSTONES, ETC.

SUBFAMILY ARENARIINÆ. TURNSTONES.

THE TURNSTONES.

Two species of this subfamily, the common Turnstone and the Black Turnstone, are found in the United States. They breed commonly in the Arctic regions. The common Turnstone is abundant on the Atlantic coast during migrations. The Black Turnstone has never been observed on the Atlantic side, but is numerous on the Pacific coast "from the Alentian Islands, south to Monterey, California." The name, Turnstone, is derived from its curious habit of turning over small stones, etc., when scratching for food, consisting almost entirely of different forms of aquatic insect-life. Both species, it is stated, nest on or near the sea beach, and deposit their eggs in slight depressions in the sand or shingle. The eggs, said to be two to four in number, are described as light olive, spotted or speckled all over with brown. Turnstones are rather small-sized birds, but, like a plover, robust in form. The head is small, neck short, wings long and pointed, and when folded reach almost to the end of the rather short and very slightly rounded tail. Lower part of tibiæ naked; legs short and stout; four toes, hind one well developed, and like the others has a sharp pointed and curved claw; anterior toes have no basal webs. The bill, shorter than the head, is stout, hard, much higher than wide, and tapers to a sharp point. Broad nasal fossæ extend about half the length of maxilla. The sexes are alike, but they vary considerably with age and season.

GENUS ARENARIA BRISSON.

Arenaria interpres (LINN.).

Turnstone; Calico-Back; Calico-snipe, etc.

DESCRIPTION (*Plate 82*).

Adult in spring.—Bill black; eyes brown; legs orange red; throat most of head above (except middle of crown, which is streaked with black and reddish) lower part of back, some upper tail-coverts, sides under surface of wings, lower part of breast, belly and under tail-coverts, white; upper part of back and wings varied with black, brown and ferruginous. The greater wing-coverts and some secondaries are mostly white; upper part of breast, fore neck, broad patches under eyes; broad bars on sides of neck, black. The young have colors much duller with little or no black or bright ferruginous. Length about 9½ inches; extent about 18½; bill little less than 1 inch.

Habitat.—Nearly cosmopolitan. In America from Greenland and Alaska to the straights of Magellan; more or less common in the interior of North America on the shores of the great lakes and the larger rivers. Breeds in high northern latitudes.

Specimens of this species have been obtained at Erie bay by Messrs. George B. Sennett and James Thompson, where this bird occurs much oftener during migrations than elsewhere in Pennsylvania.

I have seen two or three Turnstones which were killed in the fall, after severe storms, in Philadelphia and Delaware counties. This species has also been observed about the shores of the Susquehanna by Senator Gerard C. Brown, York county, W. W. Stoey, Dauphin county, and Dr. A. C. Treichler, Lancaster county.

ORDER GALLINÆ. GALLINACEOUS BIRDS.

SUBORDER PHASIANI. PHEASANTS, QUAIL, ETC.

FAMILY TETRAONIDÆ. GROUSE, ETC.

THE GROUSE AND QUAIL.

Only two species of this large and important family, containing some of the best known and most highly prized game birds, are found in Pennsylvania. These, the Ruffed Grouse or Pheasant, and the Quail or Partridge, are reported as natives in nearly every county in the commonwealth. Fifty, sixty or more years ago the Prairie Hen (*Tympanuchus americanus*, Reich.) was, it is stated, rather common in certain parts of the state. Dr. Wm. P. Turnbull* writing, in 1869, of the Prairie Hen, says: "Now very rare. A few are still met with in Monroe and Northampton counties, where I have shot the species." In recent years unsuccessful efforts have been made to introduce to Pennsylvania, with a view to naturalization, the Prairie Hen, the European or Migratory Quail (*Coturnix coturnix*, Linn.) and the California Partridge (*Callipepla californica*, Shaw). The Ruffed Grouse, an inhabitant principally of woods and thickets, is most numerous in the mountainous and elevated districts. The Quail, or Bob-white, prefers the open fields, meadows and pastures, hence is most plentiful in the fertile and productive agricultural regions, especially in the southeastern and some of the southern and western counties. Both species nest commonly on the ground, and lay many buff-colored or white eggs. The young, covered with a brownish and blackish down, are able to run as soon as they are out of the shell, and they possess an ability to hide themselves under fallen leaves or in scattered grasses and weeds, which is quite remarkable. Both species, when not breeding, are found generally in small flocks of one or two families. The Grouse does not appear to be migratory, but the Quail is of a migratory disposition. The flesh of these birds is held in high esteem by epicures. Large numbers of both species, particularly Grouse, are killed annually and shipped to the markets. They subsist chiefly on a vegetable diet, viz., the seeds of various weeds and grasses, cereals, berries, wild grapes, and other small fruits; the buds and blossoms of trees and shrubs, the tender shoots of different small plants, etc., and in summer they also devour numerous kinds of insects. Pheasants spend most of their time on the ground, but they often alight in trees and bushes to feed, roost, or to escape from enemies. Often when pursued by gunners Grouse secrete themselves in the tops of high trees, particularly hemlocks, where they frequently remain so motionless as to escape the keen eye of the most experienced hunter. Sometimes when these wily birds fly in trees they alight on large limbs, sit lengthwise, and so close to the limb as to render it difficult to detect them. At other times they perch close to the body of a stately forest monarch, and stand unright—feathers close to the body—and with neck stretched to the full extent; but even in this partly uncovered attitude they are often overlooked, being frequently mistaken for knots, bunches of lichens, leaves or rough bark. One is often surprised to see how very small a large Grouse will appear when frightened and hiding in a tree. Old hunters, who have made a careful study of both Grouse and Quail, in their natural haunts, claim that these birds, during the breeding season, leave no "scent" by which dogs, etc., can trail them, as they do at other times. Although the Quail is a resident (*i. e.*, found in the same locality during all months of the year), it is, in some parts of the state at least, more or less migratory, as is clearly shown by the fact that in the fall flocks, sometimes numbering a hundred or more birds, are seen traveling, usually, southward. Quails are terrestrial. Coveys huddle close together at night, and roost on the ground, and often, like the Grouse, when pursued, they seek shelter

* Birds of East Pennsylvania and New Jersey.

Blue Jay.

1. Male; 2 and 3. Female.

in trees. According to my observations, they do not, as a rule, attempt to hide as the Grouse does, in the thick foliage, but perch on a limb—frequently like the Grouse, on the opposite side of the tree from which they entered—mostly near the body of the tree, and squat close to the bark. In the summer, when the wife is engaged with her domestic duties, it is not uncommon to see Mr. Quail perched in an upright position on a fence, uttering his shrill and pleasing whistle that has given rise to the vernacular and appropriate name, Bob-white, In Grouse there is but little difference in the sexes, though the female, usually a little smaller, has the neck-tufts, less developed, and duller in color. The male Quail has line over eye and throat patch white; the female has these parts buff or yellowish, but otherwise is similar to male.

GENUS **COLINUS** LESSON.

Colinus virginianus (LINN.).

Bob-white; Quail; Partridge.

DESCRIPTION (*Plate 12*).

Feathers of crown lengthened and erectile, but not forming a crest as in the pheasant. Forehead, streak over eye and throat patch (white in male, buff in female) light colored, and in male particularly, bordered with black; neck all round reddish-brown varied with black and white, the latter especially showy on back of neck; rest of upper parts reddish-brown varied with black, white, gray and pale buff; tail mostly bluish-gray; under parts whitish, with reddish-brown sides streaked irregularly with black. Length about 10½ inches; extent about 15.

Habitat.—Eastern United States and southern Canada from southern Maine to the south Atlantic and gulf States; west to Dakota, eastern Kansas and eastern Texas.

This species is found in Pennsylvania at all seasons, yet I am fully convinced that many of those that breed here migrate in the autumn southward. During the fall, and particularly in the month of October, I have observed flocks, consisting of several families and numbering from sixty to a hundred or more individuals engaged in such migrations. Partridges at all seasons other than when breeding are seen in flocks. When not migrating we find them in flocks of twelve to fifteen each, frequenting fields and swamps usually near the borders of woods or thickets, to which they speedily repair when disturbed. Early in April these birds pair and about the first of May commence nesting. The nest is always placed on the ground, generally in a slight hollow, and is constructed chiefly of small twigs and grasses. The nest is usually placed in a grass field, concealed by a high tuft of grass or protected by a thick overhanging bush. The eggs are white, pear-shaped, and although variable, generally number about fifteen. The birds are mainly terrestrial in habits. In the autumn and winter, when continually pursued by sportsmen and dogs, they oftentimes, when flushed, seek refuge in trees; they usually alight on a large limb close to the main trunk and crouch so close that not unfrequently they escape the notice of the eager hunter. A gentleman of my acquaintance some years ago while out hunting pheasants noticed a slight movement among some dead

leaves in the top of an oak tree, he raised his gun quickly and fired into the leaves when to his astonishment down came fourteen partridges dead and wounded. Partridges breed readily in confinement, and occasionally, though rarely, become quite tame.

Although Quail are more or less common in nearly all counties of the commonwealth I have found them more abundant, in the hunting season, at different points along the Cumberland Valley railroad, the Northern Central railroad, and the Harrisburg and Gettysburg railroad (in Franklin, Cumberland, Adams and York counties) than elsewhere in the state. Good Quail shooting is also to be had, it is said, in certain sections of Mercer, Crawford, Lawrence, and some few other of the western and southwestern counties. In many sections of Chester, Delaware and Lancaster counties these birds are much less numerous than they were five or six years ago.

The food of this species * consists principally of cereals, various small seeds, berries, and in the breeding season insects, chiefly beetles, are taken in limited numbers. B. M. Everhart, the well-known naturalist and botanist, informs me that four or five years ago he examined the stomach-contents of twenty odd Partridges which his brother had shot when on a gunning excursion in the Delaware, and found that all the birds had fed exclusively on the seeds of skunk-cabbage (*Symplocarpus fœditus*).

The food of sixteen quails, with date of collection and locality in which they were captured, examined by myself, are given in the following table:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	July 21. 1879.	Chester county, Pa., ...	Small seeds.
2	July 21, 1879.	Chester county, Pa., ...	Wheat and berries.
3	Aug.—, 1880.	Chester county, Pa., ...	Small seeds and remains of beetles.
4	Aug. 3. 1880.	Chester county, Pa., ...	Beetles.
5	Oct. 20, 1880.	Chester county, Pa., ...	Corn and small seeds.
6	Oct. 20, 1880.	Chester county, Pa., ...	Corn and wheat.
7	Oct. 20. 1880.	Chester county, Pa., ...	Corn and seeds.
8	Oct. 20, 1880.	Chester county, Pa., ...	Wheat.
9	Nov. 20, 1880.	York county, Pa., ...	Rag-weed seeds and corn.
10	Nov. 20, 1880.	York county, Pa., ...	Corn.
11	Nov. 30, 1880.	Newark, Del., ...	Small seeds.
12	Dec.—, 1882.	Newark, Del., ...	Corn.
13	Dec.—, 1882.	Newark, Del., ...	Green vegetable material.
14	Dec.—, 1882.	Newark, Del., ...	Green vegetable material and small seeds.
15	May 20, 1884.	Chester county, Pa., ...	Small seeds.
16	May 20, 1884.	Chester county, Pa., ...	Small seeds and insects.

* The Florida Bob-white (*C. V. floridanus*, Coues) subsists to a great extent on different kinds of insects. In the months of February, March, April and the first week in May, 1885, when in Florida, I examined over one hundred of these quail and found that the greater part of their food consisted of different forms of insect-life, particularly beetles, small flies and "worms," with frequently small seeds and other kinds of green vegetable substances. In the gizzards of nine of these birds, taken late in April, were found (one or two in each bird) with other food, small batrachians, the proper name of which is unknown to me, but which the natives called "sand frogs" or "rain toads."

SUBFAMILY **TETRAONINÆ**. GROUSE.

GENUS **BONASA** STEPHENS.

Bonasa umbellus (LINN.).

Ruffed Grouse; Pheasant; Partridge.

DESCRIPTION (*Plate 65*).

Head with lengthened crest; above variously marked with different shades of black, brown, gray and whitish; lower parts much lighter, white or buff, with many broad bars of black or brown; long neck-ruffle of male glossy black with violet reflections; female with neck ruffle smaller and generally more brown. Tail of eighteen long feathers is gray or reddish-brown, with numerous transverse and irregular bars. Length about 18 inches; extent about 24; tail 7.

Habitat.—Eastern United States, south to North Carolina, Georgia, Mississippi and Arkansas.

The Ruffed Grouse is known generally throughout Pennsylvania as the Pheasant, but in some parts of the northeastern counties it is usually called "Partridge," a name by which the quail is commonly designated in most parts of this state. The grouse is an abundant resident in the mountains, wooded and thinly populated districts of Pennsylvania. In the northern tier of counties and also in the counties of Lackawanna, Wyoming, Sullivan, Huntingdon, Lycoming, Schuylkill, Clinton, Centre, Elk, Clearfield, Cameron, Westmoreland, Bedford, Perry, Forest and some few more, large numbers of these well-known game birds are killed every year. The Lehigh Valley railroad will take you to good shooting grounds in Carbon, Luzerne, Wyoming and Bradford counties, and excellent sport can be had shooting grouse in the neighborhood of Scranton and in the vicinity of Montrose, Susquehanna connty, both of which places are reached by the Delaware, Lackawanna and Western railroad. The Hudson Canal Company's roads traverse sections of Lackawanna, Wayne and Pike counties, where grouse are reported to be particularly numerous. The Beech Creek railroad and the Northern Central railroad (Elmira and Canandaigua division), as well as the Philadelphia and Erie railroad, go through some of the best Pheasant grounds I have ever visited.

Dr. Coues says: "The 'drumming' sound for which this bird is noted, is not vocal, as many suppose, but is produced by rapidly beating the wings." During the breeding season and at other times, if not continually harassed by sportsmen, the grouse is tame and unsuspicious. The nest is made on the ground, and consists principally of leaves; it is always placed in the interior of woods, and is usually concealed by a log or thick bushes. The eggs are a yellowish-white color and number about fifteen. I once found a nest with nine eggs, in which incubation was well advanced. E. A. Samuels, in his entertaining work, "*Our*

Northern and Eastern Birds," says: "From several instances which have come to my knowledge, I am inclined to think that the female Ruffed Grouse, if persistently molested when nesting on the ground, avails herself of the abandoned nest of a crow, or the shelter afforded in the top of some tall broken trunk of a tree, in which she deposits her eggs. Two of my collectors in northern Maine have sent me eggs which they positively declared were found in a crow's nest in a high pine, but which are undoubtedly of this species; and recently I have heard of another occurrence from my friend L. E. Ricksecker, of Pennsylvania. The only satisfactory theory that I can advance to account for these departures from the usual habits of the grouse, is that the birds had been much disturbed, their eggs or young perhaps destroyed; and as they are often in the trees, and are expert climbers, they laid their eggs in these lofty situations to secure protection from their numerous foes below."

Pheasants are woodland birds, but I have observed, when hunting them in the fall, that they often leave the woods and are found feeding about the edges of fields, along the borders of woods or thickets. When in such places two gunners can, if they are fair marksmen, generally have good success, if one goes along the edge of the woods and his companion takes the open territory. Hon. Nathan C. Evans, of Bedford county, informs me he has examined the crops of hundreds of these birds killed in the fall and ascertained that they subsist to a considerable extent on the leaves and blossoms of red clover. Forty-two Pheasants, taken in the months of October, November and December, in Schuylkill, Dauphin, Warren, Chester, Erie and Lancaster counties, which I have examined, were found to have fed mainly on Partridge berries, chestnuts, small seeds and other vegetable matter; ten of this lot—shot when the snow was deep—were all gorged with buds of laurel. The stomach contents of twenty-two Pheasants, captured in Wayne, Susquehanna and Wyoming counties December, 1889, and identified by my kind friend, Benjamin M. Everhart, of West Chester, consisted principally of the Fern (*Aspidium spinulosum*, Swartz, var., *intermedium*, Willd.), and False Mitre-wort (*Tiarella cordifolia*, L.) with some few leaves and a little fruit of the Partridge berry (*Mitchella repens* L.). Wilson writing of their food says: "They are exceedingly fond of the seeds of grapes; occasionally eat ants, chestnuts, blackberries and various vegetables. It has been confidently asserted that, after having fed for some time on the laurel buds, their flesh becomes highly dangerous to eat of, partaking of the poisonous qualities of the plant.† * * * Though I have myself ate freely of the flesh of the Pheasant, after emptying it of large quantities of laurel buds, without experiencing any bad conse-

* Prof. John H. Brinton, M. D., of the Jefferson Medical College, Philadelphia, Pa., informed me that he had known of several cases of *Glossitis* (inflammation of the tongue) to have been caused by eating Pheasants which had fed on laurel.—*Warren.*

Reed-bird—Bobolink.

1. Male; 2. Female.

quences, yet, from the respectability of those, some of them eminent physicians, who have particularized cases in which it has proved deleterious, and even fatal, I am inclined to believe that, in certain cases, where this kind of food has been long continued, and the birds allowed to remain undrawn for several days, until the contents of the crop and stomach have had time to diffuse themselves through the flesh, as is too often the case, it may be unwholesome and even dangerous."

FAMILY **PHASIANIDÆ.** TURKEYS, ETC.

SUBFAMILY **MELEAGRINÆ.** TURKEYS.

GENUS **MELEAGRIS** LINNÆUS.

Meleagris gallopavo LINN.

Wild Turkey.

DESCRIPTION (*Plate 74*).

Length 3 to 4 feet; extent 4 to 5 feet. Weight varies greatly; males are said to weigh from 16 to 35 pounds, and females from 8 to 14 pounds. Bare skin of head and neck blue; excrescences purplish-red; legs red; general color copper-bronze, with bright metallic reflections, each feather with a narrow blackish border; the brownish quills are barred with white; tail-feathers brown-barred with blackish; upper tail-coverts chestnut. Female smaller and much duller in color. The male has a long tuft of coarse blackish bristles on middle of breast, and stout blunt spurs.

Habitat.—United States, from southern Canada to the Gulf coast, and west to the plains, along the timbered river valleys; formerly along the Atlantic coast to southern Maine.

This noble game bird, although rapidly being extirpated, is still found in small numbers in many wooded and thinly populated districts of the state. I have seen a few Wild Turkeys within the past five years in Juniata, Schuylkill, Snyder, Mifflin and Blair counties. The following list will show reports received from various gentlemen concerning this species in other counties:

COUNTY.	OBSERVERS.	REMARKS.
Bedford.	L. J. McGregor.	Resident; most frequently seen in southern part of county.
Bradford.	J. L. Camp.	Resident; rare.
Beaver.	Dr. G. A. Scroggs.	One killed here in 1880.
Berks.	D. F. Keller.	Resident; breeds sparingly in Blue mountains.
Center.	W. P. Fisher.	Resident.
Cumberland.	T. L. Neff.	Resident.
Do.	Prof. S. B. Heigis.	Rather plentiful in North mountains; flocks 7 to 9. They are quite numerous in Perry county.
Columbia.	Dr. A. B. MacCrea.	Breeds.
Dauphin.	W. W. Stoey.	Resident.
Elk.	Capt. A. A. Clay.	Very rare.
Franklin.	H. B. Craig.	Few still found on North mountain and "Pine Hills."
Lycoming.	August Kock	Resident.
Do.	Charles H. Eldon.	Resident.
Lebanon.	J. G. Bohn.	Resident.
Do.	Geo. R. Ross.	Resident.
Luzerne.	Geo. P. Friant.	A few have been killed in this valley in recent years on the range near Pittston.

COUNTY.	OBSERVERS.	REMRAKS.
Luzerne	Dr. W. L. Hartman,	Breeds.
Do.	James F. Green,	Resident.
Do.	David J. Linskill,	Resident.
Lehigh,	J. F. Kocher,	Resident.
Monroe,	Edmund Ricksecker,	A few still in the county.
Northampton,	Dr. John W. Detwiller,	Resident.
Northumberland,	Dr. Walter Van Fleet,	Few are occasionally seen.
Perry,	H. Justin Roddy,	Resident; becoming scarcer every year.
Somerset,	Dr. H. D. Moore,	Resident; rare.
Susquehanna,	S. S. Thomas,	Common fifty years ago.
Do.	George B. Perry,	Occasional visitor.
Venango,	J. R. Robertson,	About exterminated.
Warren,	H. L. Greenland,	Straggler.
Westmoreland,	Chas. H. Townsend,	Resident; few killed in mountains every year.
York,	Hon. Gerard C. Brown,	Breeds.
Do.	Col. J. A Stahle,	Few found in South mountain.

The Wild Turkey although more brilliant in color has a very close resemblance to the domestic turkey, and some old residents affirm that the genuine Wild Turkey is now very rarely seen in this state. They believe the so-called Wild Turkeys found in the wooded and mountainous regions to be domestic birds which have wandered off and become equally as wild and cunning as the typical *Mealeagris gallopavo*, which in former years was abundant in Pennsylvania. This bird nests on the ground; eggs a little smaller, but otherwise very similar to those of our domestic turkeys. The food consists chiefly of cereals, berries, acorns, chestnuts, and other vegetable materials.

ORDER COLUMBÆ. PIGEONS.

FAMILY COLUMBIDÆ. PIGEONS.

The Wild Pigeon and the Mourning Dove are the only species of this family found in Pennsylvania. These birds never lay more than two eggs, which are pure white and unspotted. The Pigeon nests in trees, and the Dove is generally found nesting in trees or bushes, but sometimes the latter bird nests on the ground. In former years Wild Pigeons were abundant in this state, where they bred annually in immense numbers, but for the past six or eight years, but few of these birds have been found here, and when now found breeding in this commonwealth they are observed in single pairs, or in small flocks. The Dove is common and generally distributed throughout the state. When not breeding Doves are found in flocks; and in many of the southern counties they remain during all months of the year. "The gizzard is large and muscular, particularly in the species that feed on seeds and other hard fruits; the gullet dilates to form a circumscribed crop divided into lateral halves, or tending to that state. This organ at times secretes a peculiar milky fluid, which, mixed with macerated food, is poured by regurgitation directly into the mouth of the young; thus the fabled 'pigeon's milk' has a strong spice of fact, and in this remarkable circumstance we see probably the nearest approach, among birds, to the characteristic function of mammalia."—*Coues.*

GENUS **ECTOPISTES** SWAINSON.

Ectopistes migratorius (LINN.).

Passenger Pigeon; Wild Pigeon.

DESCRIPTION (*Plate 71*).

Length (depends on development of tail) about 14 inches; extent, about 25; tail has 12 feathers; bill black; legs purplish red; iris red; upper parts including chin, throat and all of head blue; lower parts brownish-red, fading on belly and white on crissum and under part of tail; sides and back of neck glossed with rich reddish-purple. The female and young much duller in color, and female is much smaller than male.

Habitat.—Eastern North America, from Hudson's Bay southward, and west to the great plains, straggling westward to Nevada and Washington Territory.

Wild Pigeons about eight or ten years ago were found in great numbers in Elk, Forest, Warren, McKean, Potter and Cameron counties. In the region about Emporium, Cameron county, and near Kane, McKean county, immense quantities of these birds were killed, packed in barrels, and shipped in car loads, to the New York market. Mr. M. M. Larrabee, of Emporium, who frequently visited their nesting places or roosts in the localities above mentioned, says that they often covered an area of several miles in the depths of the forests.

The Wild Pigeon is now found in most parts of the state as a migrant, but a few of these birds breed more or less regularly in different parts of the commonwealth. During the last five or six years when seen here, usually only single pairs, or very small flocks, have been observed nesting, and we never see large flights of pigeons anywhere in the state as in former years. In the fall of 1884, I saw about three hundred pigeons, which was the largest flock I have ever observed in the state. A hunter, residing in Potter county, told me he found, in 1888, in the northern part of Cameron county, a flock of about one hundred, which he thought were breeding in that locality. Reports which I have received through the kindness of the following named gentlemen will suffice to show the present status of the Passenger Pigeon in Pennsylvania: About 1870 were very abundant; now very rare; have only seen one in ten years—*James S. Nease, Washington county:* Occasional visitor, March or April, 1883, a flock of fifteen or twenty—*George B. Perry, Susquehanna county:* Rare; a few breed here—*H. L. Greenland, Warren county:* The pigeon has nested within the last ten years three times on Potato creek, near Smethport, McKean county, but do not think they have been there for three or four years past—*James A. Teulon (letter July, 1889), McKean county:* Rare migrant—*J. L. Camp, Bradford county:* Straggler—*R. C. Wrenshall, Allegheny county:* Breeds very sparingly in a few localities in Crawford and Erie counties—*George B. Sennett, Erie county:* A rare visitor—*N. F. Underwood, Wayne county:* Occasional migrant—*Dr.*

H D. Moore, Somerset county: Small flocks and scattered birds are now seen—*M. M. Larrabee, Cameron county:* In former years Wild Pigeons in large flocks were found roosting and breeding in the beech woods along Bowman's creek, in Wyoming county, and in Lake and Ross townships of this county, but in the last six years have seen only small flocks, and oftener only single pairs in Wyoming county. Last year (summer, 1889,) I saw a number of single pairs and their nests in Lake, Ross and Fairmount townships in this county—*David J. Linskill, Luzerne county:* No Wild Pigeons through this section since 1875, at which time they were very plenty, feeding principally in the mountains. A few stray birds have been shot this fall (1889) along the South mountain, which causes me to think that they may occasionally breed in this locality, but not in such numbers as to attract attention—*T. L. Neff, Cumberland county:* In the year 1856 this neighborhood was visited by Wild Pigeons in vast numbers. In the early morning they would fly eastward from the Laurel Hill mountains, nine miles east of Masontown, alighting in cornfields to feed; and about the middle of the afternoon they would commence their return flight to their roosting place in the mountains. They would come sometimes in such immense flocks as to almost shut out the sky, like a cloud, and two or three hours would pass during each morning and evening migration. This occurred in the early part of April. Since then there has been two similar visits, but not in such immense numbers, and I cannot now name the years. It has been perhaps twenty years since they were seen here in this manner. Formerly, in the fall, they would be found feeding upon acorns, but they have become very rare of late years—*G. W. Linton (letter July, 1889), Fayette county.* Mr. J. G. Bohn, of Lebanon, says (letter August, 1889): "In regard to Wild Pigeons, they are birds of the past in our regions. Years ago our woods were full of them; in the fall you could count them by the thousands, and here and there you could find them raising young. Our section of country is stripped of its massive forests and these birds are gone. I have not seen one in my hunts in fifteen years. I even cannot as much as get a specimen to mount. Mr. Otto Behr, of Lopez, Sullivan county, in a letter dated February 28, 1889, says: "The last 'pigeon roost' here was in 1869. * * * They say the nesting ground which was along the Mehoopany creek, Wyoming county, four miles from here, was seven miles long by two or three miles wide. In 1876 they started to build up here again when a snow storm that covered the ground for several inches drove them off. Since then they have had no regular nesting place here." Mr. Chandlee Eves, Millville, Columbia county, in a letter of September 24, 1889, gives the following interesting information of the method employed to capture pigeons: "About thirty-five years ago I used to see a great many Wild Pigeons in the spring, many were caught with spring-nets. The party catching them would have a 'bow-house,' or bough-house, to secrete themselves in; they would have

a Wild Pigeon—called the flyer—with its eyes sewed shut, which they threw out, and another which they made hover by means of a string from the bough-house. In this way large quantities of pigeons were decoyed, and as they were about to alight the net was sprung over them. Pigeon catching was quite a business with some. The flyer and stool pigeons were kept during the year in cages so as to have a stool pigeon to commence with in the spring. No pigeons have been here for the last fifteen years." The nest, generally placed in a tree, sometimes in bushes, is a flat and frail platform of sticks, so carelessly placed that the eggs, one or two in number, can be seen from below. The eggs measure about one and one-half inches long and a little over one inch broad.

GENUS **ZENAIDURA** BONAPARTE.

Zenaidura macroura (LINN.).

Mourning Dove; Turtle Dove.

DESCRIPTION (*Plate 71*).

Tail of fourteen feathers; length about 13 inches; extent about 18; bill slender and mostly black; feet purplish-red; eyes brown; upper parts olive-brown and bluish-gray; lower parts faint purplish or brownish-red, becoming much lighter behind; neck glossed with metallic purple and gold. Female and young somewhat similar but duller.

Habitat.—North America, from southern Maine, southern Canada and Oregon south to Panama and the West Indies.

The only species with which the Mourning Dove, so called from its note, can possibly be confounded is the Wild Pigeon, from which it can readily be distinguished if the following facts are remembered: The dove measures about thirteen inches in length and eighteen inches in alar extent; the pigeon about seventeen by twenty-five inches. So, first we find a marked difference in size. Secondly, the dove has *fourteen* tail feathers; the pigeon has but *twelve;* again, the eyes of the dove are brown, while those of the pigeon are red. This bird is found in several of the southern counties of Pennsylvania during all seasons of the year, and at times other than when breeding is gregarious. During the summer time it is found generally throughout the state. In March, the flocks which have been observed during the winter about the fields and orchards, separate and begin their love-making. The nest, a carelessly constructed affair, is made up entirely of small sticks, and is generally found placed on a large limb of a tree in an apple orchard. On the barren ridge, in eastern Pennsylvania, I have on several occasions found these birds nesting in pine trees; the eggs are two in number, white and unspotted. Sometimes these birds will occupy nests which have been deserted by other species. I once, some few years ago, found a

pair breeding in the nest of a Green Heron, which had been deserted by the original possessors. On another occasion, a nest was found built in that of a Crow Blackbird.

Doves also nest sometimes on the ground. Mr. Frank R. Diffenderffer, associate editor of *New Era*, of Lancaster city, and Prof. H. Justin Roddy, also of Lancaster county, both inform me they have repeatedly found them breeding on the ground. Doves seldom feed on insects but subsist almost exclusively on cereals, small seeds of different plants, and, occasionally, it is said, on various wild berries. The food materials of eleven doves which I have examined are as follows:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	Sept. 11, 1880.	East Bradford, Pa.	Grass seeds.
2	Oct. 15, 1880.	East Bradford, Pa.	Small seeds.
3	Feb. 16, 1880.	Pocopson, Pa.	Seeds and other vegetable matter.
4	March 6, 1880.	Chester county, Pa.	Seeds of *Amaranthaceæ*.
5	March 20, 1882.	Chester county, Pa.	Wheat and small black seeds.
6	April 5, 1882.	Chester county, Pa.	Corn and small seeds.
7	May 7, 1883.	West Goshen, Pa.	Wheat and corn.
8	May 25, 1883.	West Goshen, Pa.	Small seeds.
9	June 31, 1883.	West Goshen, Pa.	Wheat.
10	Nov. 29, 1886.	North Brook, Pa.	Apple seeds and seeds of grasses.
11	Nov. 29, 1886.	North Brook, Pa.	Apple seeds and seeds of grasses.

ORDER RAPTORES. BIRDS OF PREY.

SUBORDER SARCORHAMPHI. VULTURES.

FAMILY CATHARTIDÆ. AMERICAN VULTURES.

THE VULTURES.

These cowardly, ignoble, gluttonous and partly gregarious birds are found in abundance in the warmer countries, where, frequently, they are protected by law, because of their value as scavengers. Vultures subsist largely on carrion. They often collect in considerable numbers around the body of a defunct horse, cow, steer or other large sized animal, and gorge themselves until they are scarcely able to fly. When, however, their uncleanly repast is finished they usually perch on trees, rocks, fences, etc., where they remain in a quiet and sleepy attitude, with the wings drooping. Frequently if these birds are wounded, or suddenly frightened when feeding, and sometimes when their nests or young are molested, they eject the fœtid contents of the crop. Two species of the family are mentioned as occurring in Pennsylvania; one, the Turkey Buzzard as it is commonly called, is rather numerous in some parts of the state, where it also often is resident. The other species—Black Vulture—is found here only as a straggler from the south.

Red-winged Black-Bird.

1. Male Adult; 2. Female; 3. Young Male.

GENUS CATHARTES ILLIGER.

Cathartes aura (LINN.).

Turkey Vulture; Turkey Buzzard.

DESCRIPTION (*Plate 67*).

Entire plumage brownish-black, and more or less glossy; quills paler on under surface; skin of head and neck naked wrinkled, with scattering bristle-like feathers; head and neck red; bill whitish; legs and feet pinkish; iris grayish-brown; nostrils large and oval.

Nestlings.—Bare skin of head nearly white; body covered with white down. Length about 30 inches; extent of wings about 72 inches; wing about 25; tail 12 inches.

Habitat.—Temperate North America, from New Jersey, Ohio Valley, Saskatchewan region and Washington Territory, southward to Patigonia, casually northward on the Atlantic coast to Maine.

This species is found in some sections of Pennsylvania during all seasons, but during the summer months is much more plentiful than at other times. The Turkey Buzzard usually rears its young in woods or thickets, mostly near streams of water. It makes little or no effort to construct a nest; the eggs—never more than two in number, and occasionally only one—are deposited generally in a slight concavity in the ground protected by shelving or overhanging rocks. The eggs are yellowish white, spotted with different shades of brown and purple, and measure about $2\frac{3}{4}$ inches in length by nearly 2 inches in breadth. It is stated that this species sometimes breeds in Pennsylvania as early as the last week in March. I have found nine nests in Chester and Delaware counties during the past seven years; of this number seven were taken late in April or early in May, and all contained fresh eggs. The two remaining nests, found in June, contained downy young. I am informed that these birds, in Lancaster and York counties, along the Susquehanna river, are annually to be found breeding in small communities of a dozen or twenty individuals. This bird will resort for several consecutive seasons to a favorite nesting place, and occasionally when its eggs are taken will lay a second time in the same nest. The Turkey Vulture is very numerous in the southern states, where it resides all the year, but in the eastern United States, north of Pennsylvania, it is said to be quite rare. Two young which I took from the nest and kept in captivity until full grown became exceedingly tame. These birds often when feeding, and invariably if approached by a stranger, would utter a loud hiss, the only sound which this species, as well as other of the American vultures, is known to make. They fed chiefly on fresh meat, and also devoured with apparent relish earth-worms, crickets, grasshoppers and other large insects; oftentimes they also eat pieces of bread, cake and particles of apples or pears which were thrown before them. The Turkey Buzzard, in its natural state, according to Au-

dubon, sucks the eggs and devours the young of herons and other birds. I have never known them to disturb either the eggs or young of birds, but have observed that they subsist almost wholly on carrion. The benefits which these scavengers render are too well known to need any comment.

The following list, with names of observers, will give a very clear idea as to the distribution of the Turkey Buzzard in Pennsylvania:

COUNTY.	OBSERVERS.	REMARKS.
Adams.	B. H. Warren.	Resident; common in summer.
Bradford.	J. L. Camp.	Never saw one in northern Pennsylvania.
Berks.	Jonas Stern.	Breeds; rare.
Do.	D. F. Keller.	Breeds in Blue mountains.
Bucks.	Mrs. M. H. Rice.	Occasionally in flocks: Aug., Sept. and Oct.
Do.	S. Edward Paschall.*	Decidedly rare.
Chester.	B. H. Warren.	Resident; very common in summer.
Clinton.	Dr. W. Van Fleet.	Straggler.
Cameron.	B. H. Warren.	Straggler; saw one November, 1889.
Delaware.	Robt. Townsley.	Resident; most numerous in summer.
Dauphin.	W. W. Stoey.	Resident.
Erie.	Geo. B. Sennett.	Never seen here.
Franklin.	B. H. Warren.	Saw several in December, 1889; breeds.
Fayette.	G. W. Linton.	Breeds.
Juniata.	B. H. Warren.	Saw three in January, 1890.
Lehigh.	J. F. Kocher.	Breeds.
Do.	Dr. John W. Detwiller.	Seldom seen.
Lancaster.	Dr. A. C. Treichler.	Resident.
Do.	James Galen.	Resident.
Do.	H. Justin Roddy.	Resident.
Do.	W. H. Buller.	Breeds.
Lebanon.	J. G. Bohn.	Breeds.
Do.	Geo. R. Ross.	Resident.
Lycoming.	August Kock.	Straggler; got two in spring.
Lawrence.	B. H. Warren.	Saw one October, 1888.
McKean.	James A. Teulon.	Never seen here.
Montgomery.	W. P. Bolton.	Breeds.
Do.	Thomas S. Gillin.	Migrant.
Mercer.	S. S. Overmoyer.	Straggler; shot one September 1, 1884.
Northampton.	Dr. John W. Detwiller.	Seldom seen.
Do.	Edmund Ricksecker.	Straggler, spring and summer; does not breed.
Northumberland.	Dr. W. Van Fleet.	Straggler.
Perry.	H. Justin Roddy.	Seen in May, 1886; breeds. (?)
Philadelphia.	H. Jamison.	Occasional visitor.
Do.	Joseph Price Bail.	Resident.
Do.	Witmer Stone.	Seen mostly during migrations.
Do.	Geo. Spencer Morris.	Straggler.
Schuylkill.	M. M. MacMillian.	Straggler; fall 1883.
Somerset.	Dr. H. D. Moore.	Breeds.
Sullivan.	Otto Behr.	Straggler; seen in 1884.
Union.	Dr. W. Van Fleet.	Straggler.
Warren.	H. L. Greenlund.	Not found here.
Westmoreland.	Chas. H. Townsend.	Very rare, have seen several in an adjoining county.
Washington.	James S. Nease.	Resident.
Do.	M. Compton.	Occasional; flock of ten seen September, 1883.
Do.	M. T. Warrick.	Occasional; flock of ten seen September, 1883.
York.	Hon. G. C. Brown.	Breeds.
Do.	George Miller.	Breeds.
Do.	Casper Loucks.	Breeds.

NOTE.—The Turkey Buzzard breeds in many sections of Chester and Delaware counties. Alfred P. Lee has observed it as a common resident in the vicinity of Oxford; Harry Wilson has found them breeding at different points about Doe Run, and also near Parkesburg. Within a radius of about six miles from West Chester, I have found them breeding—never more than one pair in a place—in seven different localities in the counties of Chester and Delaware.

*"Decidedly rare, and absolutely unknown to most of our people. We are but a few miles from Chester county, where the bird is very common, but, Bucks county, is out of its range. I made note of having seen three (3) buzzards during the season."—*E. S. Paschall.*

GENUS **CATHARISTA** VIEILLOT.

Catharista atrata (BARTR.).

Black Vulture.

DESCRIPTION.

"*Adult.*—Entire plumage dull black, the quills grayish basally (hoary whitish on under surface), their shafts pure white; bill dusky with yellowish or whitish tip; naked skin of head and foreneck dusky. Length 23–27; extent about 54 inches."—*Ridgway Manual N. A. Birds.*

Habitat.—South Atlantic and gulf states, north to North Carolina and the Lower Ohio valley, west to the great plains, and south through Mexico and Central America and most of South America. Straggling north to New York and Maine.

The Black Vulture or Carrion Crow, as this bird is sometimes called, I have never seen in Pennsylvania. Stragglers have been observed in Northampton county by Dr. John W. Detwiller and Edmund Ricksecker, and one was taken in Perry county by Prof. H. Justin Roddy.

SUBORDER FALCONES. FALCONS, HAWKS, EAGLES, ETC

FAMILY **FALCONIDÆ**. VULTURES, FALCONS, HAWKS, EAGLES, ETC.

SUBFAMILY **ACCIPITRINÆ**. KITES, BUZZARDS, HAWKS, EAGLES, ETC.

THE EAGLES, HAWKS, ETC.

About a dozen species included in this subfamily are found regularly in Pennsylvania, and of all the numerous species of bird-life occurring in this commonwealth, few are better known to our people in general than are the Eagles and Hawks, some of which are common at all times, or during some period of the year, in every section of the state. With a few exceptions these raptores, as well as most of the owls, particularly the smaller kinds of owls, are highly beneficial to the farmer and fruit-grower, because of the immense quantities of destructive mice and other injurious animals, also large numbers of noxious insects, etc., which they devour. The majority of these birds build large nests of sticks, twigs, etc., on trees, some, however, nest on rocky ledges. The Marsh Hawk breeds on the ground, and the Little Sparrow Hawk, like the Screech Owl and Woodpecker, breeds in hollow trees. The eggs, usually two to five, sometimes more, are generally spotted and blotched, and never spherical and white, like eggs of the owls. The adult males are usually smaller than the females, and with the exception of the Marsh and Sparrow Hawks, are quite similar in color. The young or immature birds, of most species, differ greatly from the old. These birds catch their prey with their talons. Their cries are loud and harsh. Occasionally they are seen in flocks—sometimes containing several species—but usually are observed singly or in pairs. The bill is short, stout and strongly hooked, the head is completely feathered and without ear-tufts or "horns" like some of the owls; the tarsus, except in the Golden Eagle and Rough-legged Hawks, is naked. The feet have long, strong, large, sharp and curved claws; the outer toe, except in the Fish Hawk, is not reversible. The eyes directed laterally.

GENUS **ELANOIDES** VIEILLOT.

Elanoides forficatus (LINN.).

Swallow-tailed Kite.

DESCRIPTION.

Bill rather small and moderately stout and narrow; feet small but stout; claws short but strongly curved; wings very long and pointed; tail long and deeply forked. On the wing this hawk looks and moves like a huge swallow. Head, neck, band across rump, basal portion of secondaries and entire lower parts pure white; interscapulars and lesser wing-coverts purplish-black; rest of back, wings, and tail slaty-black. Bill blue black; legs and feet dull bluish-yellow; iris brown. Length variable; a female before me measures 24 inches long; wing 17; lateral tail feathers 12¼ inches.

Habitat.—Southern United States, especially in the interior, from Pennsylvania and Minnesota southward, through Central and South America; westward to the great plains. Casual eastward to southern New England.

The Swallow-tailed Kite, or "Wasp-hawk," as it is commonly called in Florida, where it is common, is a very rare and irregular visitor in Pennsylvania. A specimen in the museum of the Linnæan Society, at Lancaster city, was captured many years ago in Lancaster county. Prof. H. J. Roddy obtained one May 27, 1885, in Perry county; and a straggler was also recently found in Allegheny county by Mr. R. C. Wrenshall, of Pittsburgh. In the stomachs of five of these kites which I killed in Florida in March and April, 1885, were found several kinds of insects. According to different writers they feed principally on grasshoppers, beetles, caterpillars, small snakes, lizards and frogs. This hawk rarely alights on the ground; its food is captured and eaten when on the wing.

GENUS **ICTINIA** VIEILLOT.

Ictinia mississippiensis (WILS.).

Mississippi Kite.

DESCRIPTION.

"General form short and compact. Bill short, tip emarginated; wings long, pointed; tail rather short, emarginated; tarsi short.

"*Adult.*—Upper parts of body dark lead color, nearly black on rump; head and under parts cinereous, darkest on abdomen; quills and tail brownish-black; * * tips of secondaries ashy-white; a longitudinal stripe on each web of primaries chestnut rufous." (Length of male about 14 inches; extent about 36; female a little larger.)—*B. B. of N. A.*

Habitat.—Southern United States, southward from South Carolina on the coast, and Wisconsin and Iowa in the interior to Mexico.

Rare straggler in Pennsylvania. I have never met with it in this state. The only specimen that has been taken here, so far as I can learn, within the past twenty years, was captured in Perry county by Prof. H. J. Roddy, September, 1886.

Meadow Lark.

1. Males; 2. Female.

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GENUS **CIRCUS** LACEPEDE.

Circus hudsonius (LINN.).

Marsh Hawk; Harrier; Bog-trotter.

DESCRIPTION (*Plate 13*).

Face partly encircled by a ruff or imperfect facial disc of small stiffened feathers, as in the owls; nostrils large; wings long and pointed; tail long; tarsus long and slender.

Male.—Light bluish-gray above and on neck and breast; upper tail-coverts and most of under parts white; some under feathers under wings and lower part of breast and abdomen spotted with rusty. Female and young are dark-brown above, streaked on head and neck with reddish-brown; below reddish-brown, much brighter in some specimens than others; upper tail coverts white. Length of female about 18 to 20 inches; extent about 44; tail 9 or 10 inches; bill and claws blackish; legs, feet and eyes yellow.

Habitat.—North America in general, south to Panama.

The Marsh Hawk is most frequently seen throughout Pennsylvania in the spring and fall, but it breeds often in different parts of the state, and in some of the southern counties it is found during all months of the year. Its nests, with eggs or young, have been found by the following gentlemen in their respective counties. Dr. John W. Detwiller, Northampton; R. C. Wrenshall, Allegheny; H. J. Roddy, Perry; Dr. Van Fleet, Clinton; Geo. S. Morris, Philadelphia; Hon. G. S. Brown, York; Otto Behr, Sullivan; W. W. Stoey, Dauphin, and J. L. Camp, Bradford. I have observed the Marsh Hawk to be most numerous in the fall, frequenting the extensive and grassy meadow-lands, chiefly about the large streams.

When flying this species can easily be distinguished from other hawks by the white upper tail-coverts, so conspicuous in the females and immature birds, or those usually met with. The old male, rare and seldom found in this section, can be recognized by the bluish-white plumage.

The nest of the Marsh Hawk differs from that of all others of the family which breed here, in being placed on the ground, and usually, it is said, in a swamp or meadow. The nest, according to different writers, is composed of sticks, grasses, hay, etc., or sometimes no nest is made, the eggs simply being deposited on a bed of grass, moss, etc., on the ground. "Eggs, three to eight, 1.80 by 1.41, white or bluish-white, usually plain, but often more or less spotted or blotched with pale brown."—*Ridgway.*

Notwithstanding the fact that these hawks rarely, if ever, prey upon any kind of game except sometimes an occasional Reed bird, gunners, who so industriously search over the swamps, never fail to destroy every Marsh Hawk which comes within range of their deadly weapons.

Marsh Hawks never, to my knowledge, disturb poultry, but subsist

mainly on field mice, other small quadrupeds, frogs, large insects and sometimes, though rarely, they catch small wild birds. In writing of the food-habits, etc., of this species Nuttall says: "It frequents chiefly, open, low and marshy situations, over which it sweeps or skims along at a little distance usually from the ground, in quest of mice, small birds, frogs, lizards and other reptiles, which it often selects by twilight as well as in the open day; and at times, pressed by hunger, it joins the owls, and seeks out its prey even by moonlight."

In fourteen examinations made by myself, seven hawks had only field mice in their stomachs; three, frogs; two, small birds (warblers); one, few feathers, apparently of a sparrow (*Melospiza*) and fragments of insects; one, large number of grasshoppers with a small quantity of hair, evidently that of a young rabbit.

Genus ACCIPITER * Brisson.

Accipiter velox (Wils.).

Sharp-shinned Hawk; Partridge Hawk; "Pigeon Hawk."

Description (*Plate 14*).

A large female of this species measures about 14 inches in length by 26 inches in extent. The male is smaller. In adult birds, especially the males, the plumage of the upper parts is bluish-gray, quite dark on top of head. Iris in adult, reddish orange, in young, light yellow.

Habitat.—North America in general, south to Panama.

This extremely daring and spirited little hawk is one of the most abundant of our North American species. In Pennsylvania during the early spring, autumn and winter it is quite plentiful, being frequently met with in the mountainous and heavily-wooded districts, as well as the cultivated and rich agricultural regions. It is a native, but as such, is somewhat rare in many parts of the state. I have taken two nests, both built in low cedar trees; these nests were entirely constructed of small twigs, and were loosely, but firmly, made. The cavity of one nest was

* Birds of this genus are rather long and slender in form, and they have small heads, short wings, long tails and legs. The bluish-black bill is short and stout, maxilla being strongly hooked and sharp-pointed; the broad ovate nostrils are inserted in the greenish or yellowish cere. The tarsi are feathered in front a little less than half the length. Tarsus, especially in *velox*, is slender and in *atricapillus* rather stout; the toes are long and slender, the outer and middle united at base by a well-developed web. The black claws are very long, much curved and sharp; eyes in old birds are reddish-amber and in younger birds yellowish. The tarsus is yellowish. Birds of this genus are exceedingly active and vigilant; they fly with great rapidity and frequently pursue and catch when on the wing different species of wild birds, some of which are nearly as large as themselves. The Sharp-shinned Hawk, I have seen, capture quail when flying, and the fierce Goshawk has often been observed to pursue and overtake Wild Pigeons. These, and not, as some suppose, birds of the genus *Buteo*, are the hawks that usually commit depredations in the poultry yard and destroy numerous wild birds, particularly Grouse and Quail. The ordinary plumage of these hawks is dark brown above (very old birds, which are seldom taken, have upper parts bluish), darkest on head, and lower parts whitish, variously streaked and barred with dark brown, rusty and pale red. In old Cooper's and Sharp-shinned Hawks the breast, thighs and rest of under parts, except crissum and throat which are chiefly white, are white transversly barred with light red. Full-plumaged Goshawks have top of head black with light grayish-blue and whitish under parts, with numerous and irregular mottlings, streaks, and lines of black, white and dusky.

Baltimore Oriole, or Hang-nest.

1. Male Adult; 2. Young Male; 3. Female.

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quite superficial, but that of the other was well-formed. The eggs—each nest contained five—are deposited about the first of May. They are nearly spherical, white or bluish-white, marked with large and irregular splashes or blotches of brown, and measure about 1.46 by 1.16 inches. Gentry, a close observer and facile writer, remarks in his "Life-Histories of Birds," that the "eggs, in some instances, are laid on consecutive days, but we have positive proofs that sometimes a single day is intermitted, and at other times, even two and three days intervene between each deposit." In one of my nests I found two days to intervene after the deposition of each of three eggs, and the fifth ovum was deposited after an intervention of three days. Gentry has found them breeding in the deserted nest of the common grey squirrel. Mr. J. Hoopes Matlack, of West Chester, informs me he found a pair breeding in an old crow's nest; such sites, however, Gentry advises us, are rarely chosen. It is said this species will sometimes nidificate on a ledge or rock or hollow and decaying tree limbs. One nest, which I had the opportunity of observing from its early commencement, was built by the united labor of both birds, which occupied a period of seven days. Gentry, who, doubtless, has had a more extensive experience, gives three or four days, according to the style, as the time requisite for the construction of the nest. Various writers assert that dry grass, leaves, moss, etc., aid in the make-up of the nests; such, no doubt, is the case, but as previously stated, I have found sticks and twigs to solely constitute the nests. Incubation is alternately engaged in by both birds, which, while they show great solicitude for their offspring, repelling all bird intruders with the most determined zeal and pugnacity, will, when molested by man, show marked timidity, and leave to his desecration their nest and its contents. The young are carefully watched and fed by the parents, chiefly on a diet of small birds—sparrows principally—until, Gentry says, they are about six weeks old, when they are able to provide food for themselves.

According to Nuttall, "this species feeds principally upon mice, lizards, small birds, and sometimes even squirrels. In thinly-settled districts, this hawk seems to abound, and proves extremely destructive to young chickens, a single bird having been known regularly to come every day until he had carried away between twenty and thirty." The same writer relates a circumstance, where he was one day conversing with a planter, when one of these hawks came down and without any ceremony or heeding the loud cries of the housewife, who most reluctantly witnessed the robbery, snatched away a chicken directly before them.

Dr. Coues says: "It preys chiefly upon small birds and quadrupeds, capturing in the dashing manner of all the species of this group, and, like its small allies, feeds to some extent upon insects." Since the advent and alarming increase of the English Sparrow, it is not unusual for

the Sharp-shinned Hawk to pay occasional visits to towns and villages where he should be heartily welcomed for the destruction he causes among these feathered pests.

The food of nineteen of these hawks which I have examined is given in the following table:

No.	Date.	Locality.	Food-Materials.
1	Sept. 7, 1878, . .	Chester county, Pa., ...	Small bird (*Melospiza*).
2	Sept. 14, 1878, . .	Chester county, Pa., ...	Quail.
3	Nov. 20, 1878, . .	Newark, Delaware, . . .	Chicken.
4	Feb. 17, 1879, . .	Chester county, Pa., ...	Snow bird (*Junco*).
5	May 3, 1879, . .	Chester county, Pa., ...	Mice (*Arvicola*). [mice.
6	Sept. 10, 1879, . .	Chester county, Pa., ...	Sparrow (*Passer domesticus*) and portions of field-
7	May 30, 1880, . .	Delaware county, Pa., . .	Chicken.
8	June 2, 1880, . .	Chester county, Pa., ...	Chicken.
9	June 3, 1880, . .	Chester county, Pa., ...	Chicken.
10	Aug. 23, 1881, . .	Chester county, Pa., ...	Grasshoppers and beetles.
11	Oct. 16, 1881, . .	Chester county, Pa., ...	Quail.
12	Oct. 29, 1881, . .	Chester county, Pa., ...	Quail and fragments of beetles.
13	June 22, 1881, . .	Lancaster county, Pa., . .	Chicken.
14	Oct. —, 1881, . .	Chester county, Pa., ...	Meadow Lark (*Sturnella*).
15	Dec. 13, 1882, . .	Chester county, Pa., ...	Song Sparrow (*Melospiza*).
16	April 3, 1882, . .	Chester county, Pa., ...	Robin (*Merula*).
17	Sept. 20, 1884, . .	Chester county, Pa., ...	Sparrow (*Spizella pusilla*).
18	Oct. 3, 1886, . .	Chester county, Pa., ...	Sparrow (*Passer domesticus*).
19	Nov. 26, 1886, . .	Chester county, Pa., ...	Song Sparrow (*M. fasciata*).

Accipiter cooperi (Bonap.).

Cooper's Hawk.

Description (*Plate 67*).

Length 18 to 20 inches; extent about 36; tail about 8½; male smaller. Immature birds have upper parts brownish, more or less spotted with white and reddish brown, tail barred and lower parts white with long brown spots.

Habitat.—North America in general, south to southern Mexico.

This much detested and commonly called "Long-tailed Chicken or Pheasant Hawk," is a common native; it is resident, but is not near so plentiful during the winter months as throughout the late spring, summer and early autumn.

For impudent daring this species, without doubt, ranks preëminent among the raptorial genera. Almost every farmer or poultry raiser can reiterate instances of where he or she was the victim of pillage by this bold and audacious marauder. In the spring of 1878 a friend presented me with a Cooper's Hawk which he had caught in a steel trap, but not until he and his mate had destroyed some fifty young chickens. During one day they killed twelve. "This marauder sometimes attacks birds far superior to itself in weight, and sometimes possessed of a courage and strength equal to its own. As I was one morning observing the motions of some Parakeets, near Bayou Sara, in Louisiana, in the month of November, I heard a cock crowing not far from me and in sight of a farm house. The hawk next moment flew past me, and so close that I might have touched it with the barrel of my gun had I been prepared. Not more than a few seconds elapsed before I heard the cackling of the hens and the war cry of the cock, and at the same time ob-

served the hawk rising, as if without effort, a few yards in the air, and again falling toward the ground with the rapidity of lightning. I proceeded to the spot and found the hawk grappled to the body of the cock, both tumbling over and over, and paying no attention to me as I approached. Desirous of seeing the result, I remained still until, perceiving that the hawk had given a fatal squeeze to the brave cock, I ran to secure the former; but the marauder had kept a hawk's eye upon me, and, disengaging himself, rose in the air in full confidence. The next moment I pulled the trigger and he fell dead to the ground."—*Audubon.*

Like the Sparrow Hawk this bird has been tamed to come at call.

Nidification commonly is begun about the 20th of April, and lasts for a period of from three to five days. Occasionally this bird will deposit its eggs in a deserted crow's nest. I believe they prefer to erect their own nests, and, from my observation, am quite positive they only appropriate the nests of other birds when their own have been destroyed. The building of the nest is the conjoint labor of both birds. It is usually built in a thick woods. When in such a locality is mostly low down, yet, when, as is occasionally the case, an isolated tree is selected as the nesting site, it is frequently so placed as to render it inaccessible to all advances of the oölogist. Externally the nest is built of sticks, varying much in size. It is generally lined with the inner layer of bark, although, frequently, blades of grass, feathers, and leaves enter into the construction of the interior. While certain writers have described the nest as broad, with but a slight concavity, I would remark that such statement is not in accord with my observations, as I have invariably found the concavities to be well marked.

The eggs measure about 1.92 by 1.50 and usually number from three to four, although it is not a rare occurrence to find five. Their color is a dull, bluish-white. Exceptional sets are sometimes taken with numerous and unevenly distributed brown or reddish spots. A gentleman of my acquaintance once took four eggs from a nest which were void of spots. The female, although driven off when the first complement was taken, made in the same nest a second deposit of four eggs, and, strange to say, the last were all spotted. The period of incubation is given by Gentry to be eighteen days. Although in this particular, my observation has been somewhat limited, I am fully persuaded that the time required for this, likewise other of our *Rapacia*, is, certainly, three weeks, or over. The young leave the nest in about twenty-five days; when about eight or nine weeks old they are able to provide food for themselves: to this time, however, they are carefully guarded by the old birds, and fed almost entirely on a diet of small birds, young chickens, and some few insects.

Dr. Coues says in speaking of this hawk: "Possessed of spirit commensurate with its physical powers, it preys upon game little if any humbler than that of our more powerful falcons. It attacks and de-

stroys hares, grouse, teal, and even the young of larger ducks, in the state in which they are known as 'flappers,' besides capturing the usual variety of smaller birds and quadrupeds. It occasionally seizes upon reptiles or picks up insects. In securing its prey it gives chase openly and drives down its quarry with almost incredible velocity."

Thirty-four Cooper's Hawks, which I have examined, sixteen showed the food taken to have been chickens; ten revealed small birds—sparrows, warblers and meadow larks—two, quail; one, bull-frogs; three, mice and insects; two, hair and other remains of small quadrupeds.

Accipiter atricapillus (WILS.).

American Goshawk; Blue Hawk.

DESCRIPTION (*Plate 83*).

Length 24 inches; extent "about 46;" wing 14½; tail 11½; male smaller.

Adult.—Above dark lead color, black on top of head; white stripe over eye, and more or less indistinct about occiput; tail has four or five indistinct blackish bars; ends of tail feathers whitish; lower parts pale ashy white, with a faint leaden tint, sharply streaked with blackish and finely mottled or barred with white. The young dark brown above, feathers edged and spotted, with whitish and pale reddish-brown; below yellowish-white and spotted with brown.

Habitat.—Northern and eastern North America, breeding mostly north of the United States. South in winter to the middle States. Accidental in England.

This fierce and predatory hawk is by no means as common as either of the two species previously mentioned. I have observed the "Blue Hawk," as it is called by hunters and lumbermen, only as a rare and irregular winter visitor in Pennsylvania. Audubon found the Goshawk breeding in the Great Pine swamp in this state. Fifteen or twenty years ago these hawks, it is said, were very frequently seen during all seasons in the counties of Cameron, Warren, Elk, Potter, Wyoming, Forest and McKean, where they then, it is stated, bred regularly. Mr. M. M. Larrabee, Emporium, Cameron county, says he always met with Goshawks about the nesting places of wild pigeons, but when the pigeons left his locality these hawks also departed, and are now seen there only as rare winter visitors. Mr. Otto Behr, Lopez, Sullivan county, in a letter dated February 28, 1890, kindly furnishes the following information showing that the species still breeds in Pennsylvania: "Where we live there is any amount of virgin forest; altitude from 1,600 to 2,500 feet. The Goshawk breeds regularly in this locality. We found the nests of two, at different times, both had one young ready to leave the nest, which was built in both cases in the crotch of a beech, and composed of rather large sticks, making a very bulky and coarse looking affair. We kept one of the hawks until late in the fall, when he broke loose and got away." Prof. H. Justin Roddy, of Millersville, writing to me in July, 1889, says: "I spent two months, last July, in the pine forests of Centre county. I there saw A. *atricapillus*. I did not

1, 2. *Purple Finch.* Male and Female.

3. *Chipping Sparrow,* Male. 4. *Song Sparrow.*

secure any specimens nor find the nest, but the time of year, the circumstances under which I saw them would seem to show that they had bred or were breeding." Mr. Robert Ridgway states that the eggs, two to three, measure 2.31 long by 1.74 wide, and are white or glaucous-white, sometimes very faintly marked with pale brownish.

The following list will give a very good idea of the distribution and scarcity of this species in our state. No persons other than those mentioned below have made any reference to the Goshawk in reports received by the author:

COUNTY.	OBSERVERS.	REMARKS.
Berks.	D. F. Keller.	Rare winter visitor.
Cameron.	M. M. Larrabee.	Rare winter visitor.
Clearfield.	Dr. L. D. Balliet.	Occasional visitor.
Clinton.	Dr. Van Fleet.	Rare migrant.
Chester.	B. H. Warren.	Irregular winter visitor; five seen in ten years.
Centre.	H. J. Roddy.	Seen July, 1888; probably breeds.
Dauphin.	B. H. Warren.	Saw one January, 1887.
Erie.	George B. Sennett.	Rare visitor.
Lehigh.	J. F. Kocher.	Rare winter visitor.
Lycoming.	Charles H. Eldon.	Straggler in winter.
Do.	August Kock.	Rare visitor; have an immature bird taken in winter.
Lackawanna.	George P. Friant.	Rare; winter; have received three in ten years.
Lancaster.	Dr. A. C. Treichler.	Straggler in winter.
Montgomery.	Thos. S. Gillin.	Rare migrant.
Northampton.	O. B. Hark.	Straggler.
Do.	Dr. John W. Detwiller.	Occasional winter visitor.
Perry.	H. J. Roddy.	Shot female June, 1885; probably breeds.
Sullivan.	Otto Behr.	Regular breeder.
Susquehanna.	B. H. Warren.	Saw one December, 1889.
Warren.	H. L. Greenlund.	Straggler in severe winters.
York.	Hon. G. C. Brown.	Rare visitor.

NOTE.—Mr. Joseph Krider and other taxidermists in Philadelphia and different parts of the state say they very rarely have Goshawks brought to them.

The fierce nature of this species is well shown in the concluding paragraphs from the pen of my highly esteemed friend, L. M. Turner:* "The tracts preferred by this Goshawk are the narrow valleys, borders of streams, and the open tundra, which it constantly scans for Ptarmigan and small mammals; the Lemming forming a considerable portion of its food. It will sit for hours in some secluded spot, awaiting a Ptarmigan to raise its wings. No sooner does its prey rise a few feet from the earth than with a few rapid strokes of the wing, and a short sail, the Goshawk is brought within seizing distance; it pounces upon the bird, grasping it with both feet under the wings, and after giving it a few blows on the head they both fall to the ground; often tumbling several feet before they stop, the hawk not relinquishing its hold during the time. During the mating season of the Ptarmigans many males suffer death while striving to gain the affection of the female, for as he launches high in air, rattling his hoarse note of defiance to any other male of its kind in the vicinity, the Goshawk darts from a patch of alders or willows, or from the edge of the neighboring bluff, and with a dash they come to the ground, often within a few yards of the terror-stricken

* Contributions to the Natural History of Alaska, results of investigations made chiefly in the Yukon district and the Aleutian Islands; conducted under the auspices of the U. S. Signal Service, extending from May, 1874, to August, 1881, by L. M. Turner.

female, who now seeks safety in flight as distant as her wings will carry her. I have seen this hawk sail without a quiver of its pinions, until within seizing distance of its quarry, and suddenly throw its wings back, when with a clash they came together, and the vicinity was filled with white feathers, floating peacefully through the air. I secured both birds, and found the entire side of the Ptarmigan ripped open.

"On another occasion I shot a fine individual as it rose from a small clump of willow, to which I had approached unobserved by the bird. It had been devouring a Ptarmigan, which it had secured but a little while before. The flesh of the bird was yet warm, though nearly all devoured. The Goshawk was only wing-tipped with shot and proved to be quite vicious, seizing my boot with its talons and striving to grasp my hand with its beak. The bird was so quick that I had to call the assistance of a native to detach the claws from my clothing. Upon skinning the bird I found its crop to be full of the flesh of the bird it was eating when I flushed it. I am under the impression that the Goshawk is not able to fly with the weight of a Ptarmigan in its claws. It is a resident of the interior and comes to the coast quite early in spring."

GENUS **BUTEO*** CUVIER

Buteo borealis (GMEL.).

Red-tailed Hawk.

DESCRIPTION (*Plate 15*).

The adult is easily recognized by the red tail. The tail in young birds is usually ashy-brown, with about ten darker bands. Tail in both old and young is generally

* Birds of this genius, especially *borealis* and *lineatus* are the large hawks which we see, particularly in the late fall, winter and early spring, frequenting grassy fields, meadows, swamps, etc. These birds are the common "hen hawks" or "chicken hawks" as they are usually called; but such names are highly inappropriate, as a very small percentage of their food is poultry. Three species (especially *borealis* and *lineatus*) are common residents in Pennsylvania. In order to give a clear idea of the great benefits these "hen hawks" render the agriculturist and fruit grower, the following extracts, relating to the stomach contents of over four hundred, captured during all seasons of the year, in various parts of the United States, are taken from Dr. Fisher's report (Food of hawks and owls, by Dr. A. K. Fisher, assistant ornithologist. Annual report of U. S. Dept. Agr., Washington, D. C., 1887); Red-tailed Hawk (*B. borealis*): Of 311 stomachs examined, 29 contained poultry or game birds; 35 other birds; 203, mice; 55, other mammals; 9, batrachians or reptiles; 24, insects; 3, craw-fish; 4, offal; and 29 were empty. Two hundred and ten examined by the division contained 270 mice. Red-shouldered Hawk (*B. lineatus*): Of 102 stomachs examined, 1 contained poultry; 5, other birds; 61, mice; 20, other mammals; 15, reptiles or batrachians; 40, insects; 7, spiders; 3, crawfish; 1, earthworm; 1, offal; 1, catfish; and 3 were empty. Broad-winged Hawk (*B. latissimus*): Of 22 stomachs examined, 2 contained small birds; 3, mice; 5, other mammals; 8 reptiles or batrachians; 10, insects; and 1, earthworms. The mammals mentioned here refer mostly to mice, shrew, moles, some few squirrels and a few other kinds of quadrupeds. These hawks in form are stout and heavy; the wings long, wide and somewhat pointed; third, fourth and fifth quills longest, the first shorter than eighth, the three outer primaries in *latissimus* emarginate on innerwebs, and in *borealis* and *lineatus* the four outer quills emarginate on inner webs. The moderately long tail, conspicuously barred or highly colored, is quite broad and slightly rounded; the bluish-black bill is short, wide at base, and maxilla is lobed on edges. Legs and feet stout; tarsus feathered in front about third of length; thighs have long feathers that in some individuals reach nearly to the feet. Tarsi yellowish; cere yellowish or greenish; the eyes vary greatly, but are usually brown or yellow. Sexes similar in color; female larger than male; immature birds differ greatly from the adults. The flight of these hawks is quite vigorous, and that of *borealis*, in particular, is often long continued; but they do not fly with the great rapidity of species of the genus *Accipiter*.

tipped with white. Breast of adult mostly spotted or marked with reddish-brown; in the young, breast is pure white enclosed by numerous dark markings. Length of male, 19 to 22 inches; extent of wings, 41 to 47 inches. Female—length, 22 to 24 inches; extent, 51 to 55 inches. From a careful examination of over one hundred of these hawks, I have found that they, like other of the raptores, not only vary greatly in the markings of their plumage, but also show marked differences in the color of the irides. The iris of the adult, though usually brown, is sometimes both brown and yellowish. In immature birds the iris is commonly straw color, but sometimes it is nearly white, and occasionally, though rarely, is brown; in other specimens I have seen one-half of the iris brown while the remainder would be white or yellowish. In immature birds, light-colored irides with specks of brown are frequent.

Habitat.—Eastern North America, west to the great plains.

This hawk—the most abundant of our raptorial birds—is the detested "Hen Hawk" of the farmer. The Red-tailed Hawk is exceedingly shy and wary, and is taken with difficulty, unless approached on horse back or in a sleigh or wagon. Red-tailed Hawks in their fall migrations are gregarious. One clear, cold autumn afternoon in 1876, I saw, near West Chester, a flock of these hawks. The sky was destitute of clouds, except a cumulus stratum directly beneath, and apparently about half way between the hawks and the earth. In the center of this vapor was an opening of sufficient size to enable me to watch the gyrations of the birds; two of them suddenly separated from the main body, approached each other screaming, and apparently in great rage. They descended screaming, and, to all appearances, clinched, to within about one hundred yards of the earth, when they parted. Evidently neither bird had received much injury, as they both, after taking short flights across the meadow, ascended in company with two or three of their companions that had accompanied them part way down, to the main body. Another individual closed his wings until the body presented a triangular outline, descended with almost lightening-like rapidity to the top of a sycamore, where it alighted, and remained for some seconds pluming itself. This party of hawks, after performing for nearly twenty minutes, these, and numerous other ærial antics, continued their southern flight. Combats in midair are quite common among Red-tailed Hawks. I have repeatedly witnessed such battles, and am fully convinced that in the great majority of cases food is the incentive to such action. Illustrative of the superior vision of this hawk—and the same applies to other of the *Rapacia*—the following is given, as observed by the writer: A clear morning early in March, I saw a Red-tail circling over the meadows; every circle took him higher and higher in the air, until at an altitude where he appeared no larger than a blackbird, he stopped, and with nearly closed wings, descended like an arrow to a tree near by me; from this perch, almost the same instant he had alighted, he flew to the ground and snatched from its grassy covert a mouse. The momentum with which this bird passed through the atmosphere produced a sound not very unlike that of the rush of distant water. This species when wounded,

like all other rapacious birds, will defend itself with its claws and bill against all advances. A stick or gun barrel presented to it, when crippled, will be grasped, and the bird can be carried pendant from the same a considerable distance before it will loose its hold. With such tenacity do they hold on that a friend of mine who had winged one, in his endeavors to capture it alive, had the bird to fasten on his forearm with both claws; to relieve himself he was obliged to take out his penknife and sever the tendons of both legs.

Nest building generally occurs in March and lasts from eight to fifteen days. The nest is built in the woods, commonly on a large oak or hickory tree. A pair of these hawks resorted for five consecutive years to a large oak tree (*Quercus tinctoria*), for nesting purposes, in a belt of timber adjacent to the far-famed Deborah's Rock, East Bradford township. The nest a rather bulky structure, is made, externally, of sticks and twigs, some of the former being an inch in thickness; internally, it is lined with leaves and the inner layer of bark—usually from the oak and chestnut trees. This lining of bark is frequently torn in shreds.

Certain ornithologists, Audubon among the number, have found five eggs in their nests. I have, however, mostly found two, and on no occasion have I found more than three to constitute the full complement. The eggs, about 2.40 by 1.85 inches, vary much in their markings. Their ground color is a dull white or rusty white, marked with minute brown spots, or with large purplish dark-brown blotches, often covering the greater part of the egg. Incubation lasts about three weeks. Certain writers claim that this species will boldly defend invasion of its home on the part of man. Such may have been the experience of others, but such statement is the reverse of my experience. I have taken both eggs and young, and, as yet, I have encountered no opposition; but have found them cowardly, flying away, in fact, beyond gunshot at my approach, uttering cries of distress, and seemingly to engage in mutual condolence over their misfortune.

During the breeding season they frequently hunt together for food for themselves and young, "and if, perchance, they spy a squirrel on a tree, one will drive it while the other poises itself ready to seize it if it dodges to the other side to evade the grasp of the first hawk. From the two there is no escape. Grasping it firmly by the neck, the assailant practically demonstrates the possibility of garroting its victim, when the ill-fated squirrel is carried to the eyry and torn to pieces to satiate the cravings of their rapacious young."—*Wood.* In consequence of limited space it is impracticable to give in detail the results of dissections which I have made of this species, but would state briefly that my examinations of one hundred and seventy-three Red-tails captured in Pennsylvania, chiefly in Chester county, revealed in one hundred and twenty-

eight, principally field-mice (*Arvicola*) and other small quadrupeds, also some few small birds; in nine of these one hundred and twenty-eight hawks, small birds were present in addition to the quadrupeds. Fourteen had fed on chickens; six, small birds—meadowlarks and sparrows; six, rabbits; three, quail; three, red squirrels; three, mice and insects; three, snakes; two, remains of skunk; two, carrion; one, ham skin; one, meat, probably beef. I have repeatedly found three and four mice in the viscera of one bird, oftentimes five, and in a few instances as many as *seven* of these destructive little rodents were obtained from the crop and stomach of one hawk.

NOTE.—Harlan's Hawk (*Buteo harlani*, Aud.) mentioned, page 237, in first edition of *Birds of Pennsylvania*, is not a distinct species but a race or "form" of the Red-tail. The technical name of Harlan's Hawk should be, Mr. Ridgway says, *Buteo borealis harlani* (Aud.). *See Auk. Vol. vii, No. 2, p. 205.* The only specimen of this variety of the Red-tailed Hawk which I have heard of in Pennsylvania was a female captured by Dr. W. Van Fleet, of Renovo, in January, 1875, near Watsontown, Northumberland county.

Buteo lineatus (GMEL.).

Red-shouldered Hawk; Winter Falcon.

DESCRIPTION.

Total length: Female, 21 to 23 inches; extent about 44 inches; wing 14; tail 9 inches. Male, 18 to 20 inches; extent about 40; wing, 12; tail, 8 inches.

Adult.—Shoulders rich reddish-brown, rest of upper parts blackish, spotted with reddish-brown, white and dusky; primaries blackish above and spotted with white; tail with three or four broad black bars, between which are narrow white bands, tip of tail whitish; under parts reddish-brown more or less streaked with dusky and barred with white.

Young.—The upper parts brownish varied with rusty and whitish. The shoulders in many specimens show considerable red; tail brownish with several small blackish bars, lower parts white and yellowish-white, with stripes and large oblong spots of brown.

Habitat.—Eastern North America, west to Texas and the plains, south to the Gulf coast and Mexico.

During the winter these hawks frequent principally the large water courses, meadow-lands, and the vicinity of ponds, and not unfrequently an individual of this species can be observed on its perch overlooking a spring-head. When the streams and meadows are frozen I have noticed that they especially resort to such localities as last named. When disturbed from its perch it utters, in a plaintive and impatient voice, the note, *keeo, keeo.* Its flight, generally short, is graceful and very owl-like. This hawk, like its relative, the Red-tail, may be observed sitting by the hour on some favorite tree or stake adjacent to swampy

or boggy ground, watching for small quadrupeds and batrachians, which constitute its principal fare.

Like other birds of this genus, the Red-shouldered Hawk nests in trees, usually in April and May in this locality. The eggs, two to four in number, are very similar to those of the Red-tail, but smaller. Young birds, which are known to many as Winter Falcons, are, according to my experience, much more frequently met with than full-plumaged adults. Nuttall remarks that this hawk lives principally on frogs, and probably insects and cray-fish in the winter. Gentry tells us that the food of the young consists of fragments of quadrupeds, besides an immense number of young grasshoppers and beetles. In my examinations of fifty-seven of these hawks which have been captured in Pennsylvania, forty-three showed field-mice, some few other small quadrupeds, grasshoppers and insects, mostly beetles; nine revealed frogs and insects; two, small birds, remains of small mammals and a few beetles; two, snakes and portions of frogs. The gizzard of one bird contained a few hairs of a field-mouse and some long black hair which appeared very much like that of a skunk. The bird on dissection gave a very decided odor of skunk. In two of these hawks, shot in Florida, I found in one portions of a small catfish, and in the other remains of a small mammal and some few coleopterous insects (beetles).

Buteo latissimus (Wils.).

Broad-winged Hawk.

Description (*Plate 16, Fig. 1*).

Length of female about 17; extent about 36; tail about 7½ inches.

Adult.—Upper parts umber-brown, and many feathers edged with rusty or whitish; tail crossed by three black and two white bands, and narrow white tip, lower parts white or yellowish white, variously streaked and spotted with rusty. Young are duller, showy dark cheek patches; tail, grayish-brown, with whitish tips and crossed with five or six indistinct dusky bands; lower parts similar to adult but paler and spotted or streaked with black and dusky.

Habitat.—Eastern North America, from New Brunswick and the Saskatchewan region to Texas and Mexico, and thence southward to Central America, northern South America, and the West Indies.

Of the genus *Buteo*, in this section, the Broad-winged is the least abundant. It is a native and resident. The movements in the air of this hawk are easy and beautifully graceful. When in quest of food, its flight is in circles. At times, when circling, like the Sparrow Hawk, it will stand for an instant beating the air, and then descend with great velocity upon its prey, which it secures, not in its descent, but as it is on the rise. I have on more than one occasion witnessed this species

1. American Goldfinch.
2. Pine Finch. 3. Fox Sparrow.
Males.

take aliment in the way described. I incorporate it, notwithstanding that it disagrees with certain good authority.

Nest-building takes place from the first to the middle of May, and the four nests which I have found have all been located in high trees; three in hickory trees, the other in an oak. All of these nests were over fifty or sixty feet from the ground. The nest is very similar to that of the Cooper's Hawk; it is made of sticks, twigs, leaves and rootlets, lined with feathers; one I found lined with bark. The complement of eggs is usually four, although three sometimes is the full set. The eggs are somewhat larger than those of the Cooper's Hawk, with a dull white, grayish ground color, with brownish red spots, which vary in size from specks to large patches, frequently confluent.

This hawk is generally easily captured, appearing quite tame and unsuspicious. I have always found it to be cowardly, and to evince no disposition to repel an invasion of its nest.

It would seem, however, that the disposition of this bird, under certain circumstances, is very variable. Mr. A. G. Boardman, of Maine, who has found several nests, and secured the eggs, finds it to be courageous and spirited. A man whom he had employed to obtain a nest, was attacked with great fury, while ascending the tree; his cap was torn from his head, and he would have been seriously injured if the bird had not been shot. Another instance is mentioned by Dr. Wood, where this hawk attacked a boy climbing to her nest, fastened her talons in his arm, and could not be removed until beaten off and killed with a club.

In speaking of this bird, Dr. Wood says: "Seldom, if ever, does it seize its prey on the wing, but secures it mostly on the ground, subsisting on frogs, snakes, mice and small birds, devouring the latter without removing the feathers. This hawk in its habits is not as neat in preparing its food as most of its genus; holding its prey with both feet, it tears and eats without much regard to cleanliness or feathers."

In twelve specimens examined by myself, four revealed mice; three, small birds; four, frogs; one, killed the 22d of May, 1882, was gorged with cray-fish, with which were traces of coleopterous insects (beetles).

Genus **ARCHIBUTEO** Brehm.

Archibuteo lagopus sancti-johannis (Gmel.).

American Rough-legged Hawk; Black Hawk.

Description.

"Adult male and female: Too variable in plumage to be concisely described. In general, the whole plumage with dark brown or blackish and light brown, gray, or whitish, the lighter colors edging or barring the individual feathers; tendency to excess of the whitish on the head, and to the formation of a dark abdominal zone or area which may or may not include the tibiæ; usually a blackish anteorbital and

maxillary area. Lining of wings extensively blackish. Tail usually white from the base for some distance, then with dark and light barring. The inner webs of the flight feathers extensively white from the base, usually with little, if any, of the dark barring so prevalent among buteonine hawks. From such a light and variegated plumage as this, the bird varies to more or less nearly uniform blackish, in which case the tail is usually barred several times with white. * * Length of a female, 22.00; extent, 54.00; wing, 17.50; tail, 9.00; iris light brown; bill mostly blackish-blue, cere pale greenish-yellow, feet dull yellow, claws blue-black. This is about an average size; the male averages smaller."—*Coue's Key.*

Habitat.—Whole of North America north of Mexico, breeding north of the United States.

In any plumage this bird can easily be distinguished from other of our hawks by the tarsus, which is thickly feathered in front to the toes. I have found the Rough-legged or Black Hawk in Pennsylvania only as a winter sojourner, about the meadows and grass fields along or near large streams. In the winter of 1879, when hunting along the Brandywine creek, I saw seven of these hawks at one time, perched about on trees in a meadow of some five acres in extent. In this locality the species is usually found singly or in pairs. The Rough-legs generally migrate northward about the middle of March: I have, however, observed them here late in April. "Its migrations appear to be quite regular and extensive—more so, perhaps, than is generally supposed—though probably it does not differ from most hawks in this respect. Birds of this family must follow their prey, wherever this leads them, and only a few of the more powerful species, able to prey upon hares and Ptarmigan, pass the winter in our highest latitudes. The Rough-legged is a rather northerly species, rarely, if ever, breeding within the limits of the United States, and becoming rarer towards its southern terminus."—*Coues.*

I desire to correct here an error which I am confident was made in the first issue of the *Birds of Penna.*, pp 92–93, where I stated, on the authority of Mr. Samuel B. Ladd, of West Chester, Pa., that he (Mr. Ladd) had, April 5, 1886, found a nest and two eggs of this bird, in a thick woods at Fite's Eddy, on the Susquehanna river. A description of the nest and eggs was published in my first report, as given to me by Mr. Ladd, but I have since learned from Mr. Ladd that he did not *secure* or even *see* the hawks, hence I am satisfied that this "record" was without doubt based on erroneous identification. Dr. C. H. Merriam, Ornithologist, United States Department of Agriculture, Washington, D. C., informs me that he is not aware of a single authentic record of the breeding of the Rough-legged Hawk anywhere within the limits of the United States.

"It is a sluggish bird, and confines itself to the meadows and low grounds bordering the rivers and salt marshes along our bays and inlets. In such places you may see it perched on a stake, where it remains for hours at a time, unless some wounded bird comes in sight, when it sails after it, and secures it without manifesting much swiftness of flight. It

feeds principally on moles, mice and other small quadrupeds, and never attacks a duck on the wing, although now and then it pursues a wounded one. When not alarmed it usually flies low and sedately, and does not exhibit any of the courage and vigor so conspicuous in most other hawks, suffering thousands of birds to pass without pursuing them. The greatest feat I have ever seen it perform was scrambling at the edge of the water to secure a lethargic frog. They alight on trees to roost, but appear so hungry or indolent at all times that they seldom retire to rest until after dusk. Their large eyes, indeed, seem to indicate their possession of the faculty of seeing at that late hour. I have frequently put up one that seemed watching for food at the edge of a ditch long after sunset. Whenever an opportunity offers they eat to excess, and, like the Turkey Buzzards and Carrion Crows, disgorge their food, to enable themselves to fly off. The species is more nocturnal in its habits than any other hawk found in the United States. The number of meadow mice which this species destroys ought, one might think, to secure it the protection of every husbandman."—*Audubon.*

In the stomachs of eleven of these hawks, which I have examined, were found only field mice.

Genus **AQUILA** Brisson.

Aquila chrysaëtos (Linn.).

Golden Eagle.

Description.

Tarsi densely feathered all round to base of yellow toes. Length about 3 feet; extent 6½ to 7½ feet.

Adult.—General color dark brown; the lengthened, pointed feathers of hind-neck golden brown; feathers of tarsi pale yellowish-brown; tail blackish and grayish.

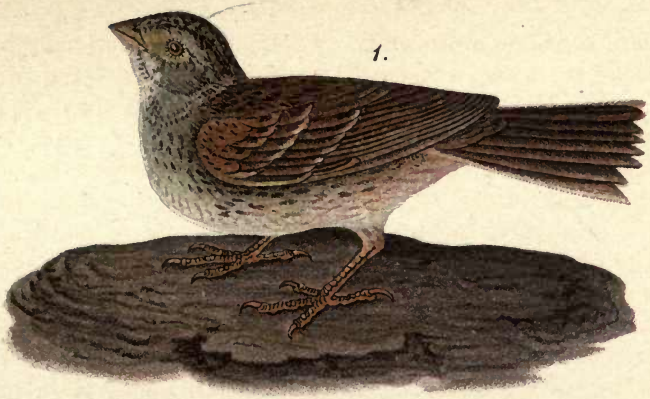
Young.—Basal two-thirds of tail white, with a blackish terminal band; lower parts much lighter than adult.

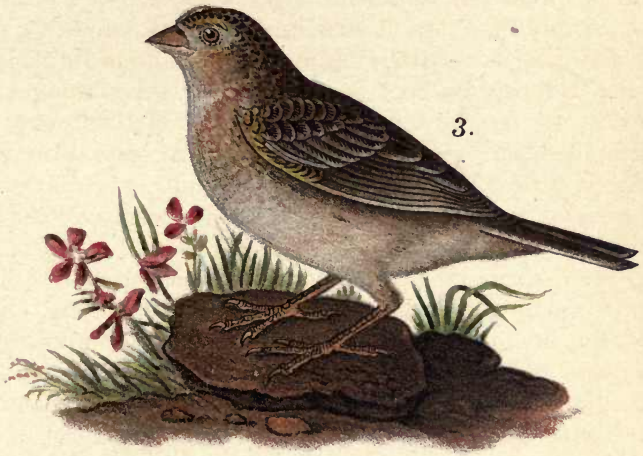
Habitat.—North America south to Mexico, and northern parts of the Old World.

This large bird occurs in Pennsylvania as an occasional winter visitant. The only species with which it is sometimes confounded is the Bald or White-headed Eagle in immature plumage. The two species can always be distinguished at a single glance, if you remember that the Golden Eagle has the tarsus *densely feathered* to the toes, and the Bald Eagle has a *bare tarsus.* One of the largest Golden Eagles I ever saw was captured in December, 1889, by a hunter, in Cameron county. This bird, which was handsomely mounted by my friend, Mr. M. M. Larrabee, of Emporium, weighed, Mr. Larrabee informed me, twenty-five pounds. This bird breeds in high mountainous regions and the Arctic countries.

The following mention of the peculiarities of the Golden Eagle in captivity I gleaned from conversation with Mr. B. M. Everhart, who for

several years kept one in his yard. This bird, in consequence of a gunshot wound in the wing, was unable to fly off. All the yard situated to the north and east of the house was known as Nero's (bird's name) domain. Along the walk leading to my office was his perch, a dead tree stump some eight feet high. When satiated with food he would sit there for hours at a time. If at any time during the day a cat or domestic fowl happened to enter his ground, it had to make a speedy departure or be killed. The latter was mostly the case, for Nero seldom "went for" anything without his capturing it. When I neglected to give him his daily allowance (two pounds meat), as was sometimes the case, he wandered about the yard uttering a ventriloquial, gutteral sound, which had the effect of bringing around him birds and chickens. Occasionally the former, and invariably the latter, would be killed. Towards people other than myself he displayed great animosity, this being particularly the case with children and timorous individuals. One day Joshua Hoopes, a school teacher at that time, brought a party of his boys to see the bird, and I noticed one of their number, a puny and delicate lad, the eagle continually eyed and several times endeavored to make at him. Towards a female domestic, who had annoyed him by throwing water on him and poking at him with a stick, he showed great antipathy; we were eventually obliged, for her personal safety and our own convenience, to discharge the girl, as she could not go into the yard without being attacked. An Irishman one day slyly entered the yard, but in crossing Nero's province he was set upon by the bird. In the fleshy part of the man's thigh he imbedded his talons, and it was with considerable difficulty his hold was loosened. Erin's son declared that "Niver before in his howl life had he seed sich a divil," and that nothing short of the eagle's life could appease for his injuries. Examination showed that although there were ugly flesh wounds, nothing of a serious nature would follow. This information being imparted, and a two dollar bill tendered to the Irishman, his sufferings were much relieved. He stated that although he looked upon the "critter" as a "bold, bad burd," still he deemed him a fit subject to "kape frum" any intrusion in the back yard, and that in the future, whenever he had any business with Bridget, he would enter the front gate and make known his wants at the front door. The strongest and largest tom cat he could manage with ease. When anyone had a specially objectionable cat which they wanted disposed of, they would bag it up and bring it to the eagle. As soon as he saw the bag—now the bird, which an instant before sat moping, ruffed-feathered and seemingly half dead, suddenly, as if by magic, changed, as it were, into a new being; body erect, feathers close to the body, tail expanded, the sunken eyes with ten-fold increased lustre, followed with argus gaze every motion of the bag and occupant; soon as grimalkin was liberated the eagle swooped down and grasped it. If the cat was of ordinary size, Nero displayed little concern in dis-





1. *Vesper Sparrow.*

3. *Yellow-winged Sparrow.* 2. *Field Sparrow.*

patching it; but if it was a Thomas feline, of huge dimensions, all the powers of the bird were brought into requisition. Then the true nature of the eagle was seen. The eyes, before bright, now shone like balls of fire, the crest feathers standing up; his voice, before hushed, now added discord to the dying yells of his struggling victim, so inextricably fixed in his relentless talons. He could kill a cat in from two to five minutes. Commonly, the eagle would grasp the cat around the small of the back with one foot, and with the other he encircled the neck, thus retaining his hold until the animal had ceased its struggles, which were soon over, as they were greatly augmented by fright and excessive violence of action. When the cat became quiet the eagle would raise his wings, which he had allowed to drop, draw his body up as high as possible from his prey, and proceed leisurely to tear off the skin from his captive's back and side, exposing the muscles and viscera, which he ate.

"Young fawns, raccoons, hares, wild turkeys and other large birds are their usual food; and they devour putrid flesh only when hard pressed by hunger, none alighting on carrion at any other time."—*Audubon.*

GENUS **HALIÆETUS** SAVIGNY.

Haliæetus leucocephalus (LINN.).

Bald Eagle.

DESCRIPTION (*Plate 84*).

Tarsi feathered *only* about half way down.

Male.—Length about 3 feet; extent of wings about 7 feet. Female larger, measuring sometimes 8 feet in extent.

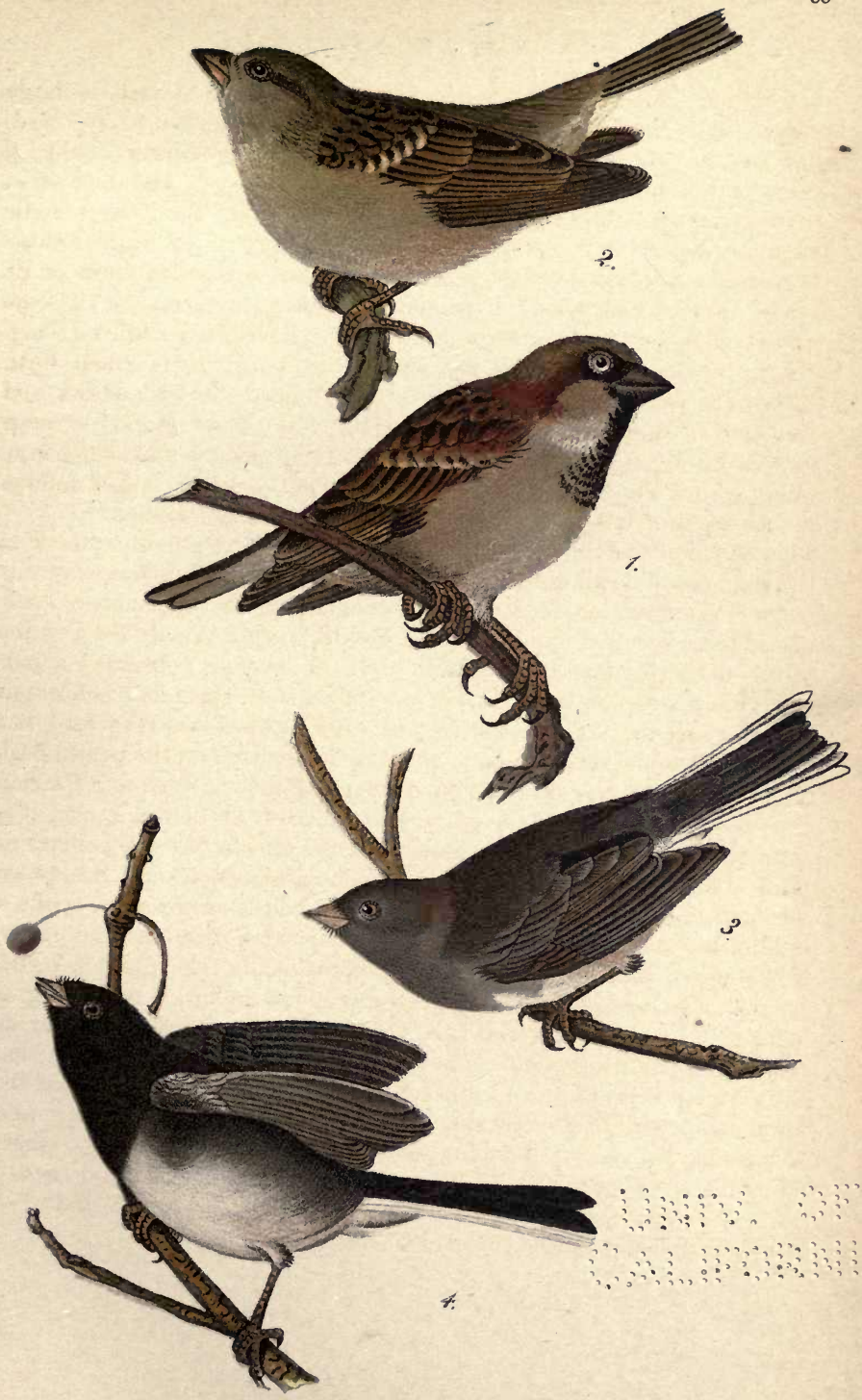
Adult.—Head, neck, tail and upper coverts of latter, white; rest of plumage dusky-brown; bill, feet and eyes yellow.

Young.—Entire plumage dark-brown; some are grayish-brown, and tail more or less spotted with white; bill dark-colored; eyes brown.

Habitat.—North America at large, south to Mexico.

The name "Bald," which is given to this species is not applied because the head is bare, but because the feathers of the neck and head in the adults are pure white. In Pennsylvania, as well as throughout the United States, we have but two species of eagles. The "Black," "Gray" and "Washington" Eagles are all young of the Bald Eagle. Three years, it is stated, are required before this species assumes the adult plumage. The Bald Eagle is found in Pennsylvania at all seasons of the year. A few of these birds annually rear their young along the Susquehanna river, and also in a few other localities in this state. The nest, a bulky affair, built usually on a large tree, mostly near the water, is said to be about five or six feet in diameter. It is made up chiefly of large sticks, lined inside with grasses, leaves, etc. The eggs commonly 2—rarely 3—are white and measure about 3 by 2½ inches. A favorite article of food with this bird is fish, which he obtains, chiefly, by strategy

and rapine. The Bald Eagle is quite plentiful in the vicinity of large rivers, where the Fish Hawk is common; unlike this last named bird, however, he cannot be called piscivorous, as he subsists largely on ducks, geese and other aquatic birds. Referring to this eagle, Audubon says: "No sooner does the Fish Hawk make its appearance along our Atlantic shores, or ascend our numerous and large rivers, than the eagle follows it, and, like a selfish oppressor, robs it of the hard-earned fruits of its labor. Perched on some tall summit, in view of the ocean, or of some water-course, he watches every motion of the Fish Hawk while on wing. When the latter rises from the water, with a fish in its grasp, forth rushes the eagle in pursuit. He mounts above the Fish Hawk, and threatens it by actions well understood, when the latter, fearing perhaps that its life is in danger, drops its prey. In an instant, the eagle, accurately estimating the rapid descent of the fish, closes his wings, follows it with the swiftness of thought, and the next moment grasps it. * * This bird now and then procures fish for himself by pursuing them in the shallows of small creeks. I have witnessed several instances of this in the Perkiomen creek in Pennsylvania, where, in this manner, I saw one of them secure a number of *Red fins*, by wading briskly through the water, and striking at them with his bill. I have also observed a pair scrambling over the ice of frozen pond to get at some fish below, but without success. It does not confine itself to these kinds of food, but greedily devours young pigs, lambs, fawns, poultry and the putrid flesh of carcasses of every description, driving off the vultures and Carrion Crows, or the dogs, and keeping a whole party at defiance until it is satiated." Even man is not exempt from the attacks of these predacious birds. I have repeatedly seen in newspapers, accounts of combats between men and eagles; frequently the bird would be the aggressor. While it is admitted that these reports are largely due to the imaginative reporter, it is believed that such occurrences do occasionally take place. Veritable instances are related of their carrying off infants. According to Wilson, "an attempt of this kind was made upon a child lying by its mother, as she was weeding a garden, at Egg Harbor, New Jersey, but the garment seized upon by the eagle giving way at the instant of the attempt, the child's life was spared." Nuttall speaks of an instance said to have happened at Petersburg, Ga., near the Savannah river, "where an infant, sleeping in the shade near the house, was seized and carried off to the eyry, near the edge of a swamp, *five miles* distant, and when found, almost immediately, the child was dead."



1, 2. English Sparrow.
Male and Female.

3, 4. Snow-Bird.
Female and Male.

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SUBFAMILY **FALCONINÆ.** FALCONS.

GENUS **FALCO** * LINNÆUS.

Falco peregrinus anatum (BONAP.).

Duck Hawk; Great-footed Hawk.

DESCRIPTION (*Plate 85*).

Size as well as colors variable. A female before me is 20 inches long, and measures from tip to tip 46 inches; tail 8. Male smaller. Above blackish-brown or slaty-black, and many feathers with paler edgings; chin, throat, fore part of neck and upper breast yellowish white, and sometimes nearly immaculate, but usually more or less streaked or spotted; showy black ear patches; frontal feathers whitish, rest of under parts barred and streaked with blackish and lighter colors; young birds are more brown, and lower parts are much more spotted with dark and less barred. Bill bluish-black, except about base, like cere is yellowish; legs yellow; iris brown.

Habitat.—North America at large.

This bold and predatory hawk, the largest of the typical falcons found in this region, retires, usually, during the summer time to the mountainous districts, generally in the neighborhood of large streams, and in the winter season (fall, winter and early spring) it is found as an irregular visitor in nearly all sections of our commonwealth. The Duck Hawk breeds in several localities in Pennsylvania, and in some parts of the state it is reported to be quite common. The late Judge Libhart, of Lancaster county, twelve or fifteen years ago observed it as a "resident, common on the Susquehanna." Dr. Treichler, Mr. Roddy and other more recent observers, report the Duck Hawk in Lancaster county as a rather rare visitor, commonly seen in winter. The following gentlemen report this species as a native: Hon. Gerard C. Brown, Casper Loucks and George Miller, all of York county, state that it is a regular breeder on the high cliffs about the Susquehanna. Concerning the bird Mr. George Miller furnishes the following notes: "Found nest of Duck Hawk April 7, 1880. It contained four eggs slightly incubated; hawk on nest when discovered, along Susquehanna river near mouth of Codorus creek. Nest about one-third down from top of a high cliff on shelf with overhanging rock; nest made of rocky *débris* found lying about. Remains of birds, such as tame pigeons, flickers, blackbirds, etc., upon which the Duck Hawks had evidently been feeding, were found

* Birds of this genus can easily be distinguished from all others of the family by the toothed beak. The Sparrow Hawk, like the members of the genera *Buteo* and *Archibuteo*, merits protection, as it feeds mainly on destructive insects and rodents, and also destroying many English Sparrows. The Pigeon and Duck Hawks are not classed with the beneficial raptores; they seldom prey on insects or mice, but destroy numerous kinds of birds. The Duck Hawk is particularly bold and predacious; he devours poultry, wild ducks and many other kinds of game, birds, etc. The wings are long and pointed; the flight is vigorous and rapid; bill short, stout and wide at base with a prominent tooth and notch near the end. The upper mandible is strongly curved to the sharp-pointed end; nostrils circular, with prominent central tubercle; tarsi stout, short and feathered only slightly in front; middle toe long; claws much curved, long and very sharp.

plentifully scattered over the rocks. I shot the male soon after collecting the eggs, and have it now in my collection of birds." Dr. W. L. Hartman, of Luzerne county, says: "The Great-footed or Duck Hawk breeds regularly in this locality (Pittston) in an almost inaccessible ledge of rocks." Mr. Thomas S. Gillin, Ambler, Montgomery county, says: "I have had many opportunities of observing them, having shot twelve inside of a radius of five miles of this place; in fact see them regularly, and know of two nesting places in this state." Dr. T. Z. Hazzard, Allegheny county; Mr. O. B. Hark, Northampton county, and W. P. Bolton, Montgomery county, also mention it as a breeder. Dr. John W. Detwiller and Mr. Samuel Mack, both residents of Bethlehem, have, on different occasions, found Duck Hawks' nests. With regard to their breeding in this state, Dr. Detwiller (letter November 2, 1889) says: "Duck Hawk, secured set of four eggs from the cliffs of 'Camel's Ledge,' Pittson, 1880; 1886 secured two sets of four eggs in each set, one at Skinner's Eddy and the other at 'Buttermilk Falls,' Susquehanna river (East branch). 1887 secured a set of four eggs, and another of three, at 'The Narrows,' Delaware river. Month of incubation, April."

Reports which I have received from other naturalists and collectors, show that the Duck Hawk has been observed in other parts of the state as a straggler in the spring and fall, or as a rather rare and irregular winter visitor. I have never found the nest of this bird. Dr. Coues states that it "breed as far south as Virginia at least; eggs, 2–5, oftener 3–4, 2.10 to 2.35 × 1.60 to 1.75, averaging about 2.25 × 1.65; white or whitish, spotted, blotched, wreathed, clouded, etc., with the reddish-browns, from chocolate or even purplish to the ochres."—*Key. N. A Birds.*

"He pursues the smaller ducks, water-hens, and other swimming birds; and, if they are not quick in diving seizes them, and rises with them from the water. I have seen this hawk come at the report of a gun, and carry off a teal, not thirty steps distant from the sportsman who had killed it, with a daring assurance as surprising as unexpected. This conduct has been observed by many individuals, and is a characteristic trait of this species. The largest bird that I have seen this hawk attack and grapple with on the wing is the Mallard.

"The Great-footed Hawk does not, however, content himself with water-fowl. He is generally seen following the flocks of pigeons, and even blackbirds, causing great terror in their ranks, and forcing them to perform aërial evolutions to escape the grasp of his dreaded talons. For several days I watched one of them that had taken a particular fancy to some tame pigeons, to secure which, it went so far as to enter their house at one of the holes, seize a bird, and issue by another hole in an instant, causing such terror among the rest as to render me fearful that they would abandon the place. However, I fortunately shot

the depredator. They occasionally feed on dead fish that have floated to the shores or sand-bars."—*Audubon.*

I have examined but three of these hawks; the stomachs of two were destitute of food materials, the other contained a few feathers of a domestic pigeon.

Falco columbarius Linn.

Pigeon Hawk.

Description (*Plate 85*).

Adult Male.—Entire upper parts bluish-slate color, every feather with a black longitudinal line; forehead and throat white; other under parts pale yellowish or reddish-white; every feather with a longitudinal line of brownish-black; tibiæ light ferruginous, with lines of black; quills black, tipped with ashy-white; tail light bluish-ashy, tipped with a white and with a wide subterminal band of black, and with several other transverse narrower bands of black; inner webs nearly white; cere and legs yellow; bill blue; iris brown.

Younger.—Entire upper plumage dusky-brown, quite light in some specimens, and with a tinge of ashy; head above, with narrow stripes of dark brown and ferruginous, and in some specimens many irregular spots and edgings of the latter color on the other upper parts; forehead and entire under parts dull-white, the latter with longitudinal stripes of light-brown; sides and flanks light-brown, with pairs of circular spots of white; tibiæ dull white, with dashes of brown; tail pale brown, with about six transverse bands of white; cere and legs greenish-yellow.

Young.—Upper plumage brownish-black, white of the forehead and under parts more deeply tinged with reddish yellow; dark stripes wider than in preceding; sides and flanks with wide transverse bands of brownish-black, and with circular spots of yellowish-white; quills black; tail brownish-black, tipped with white, and with about four bands of white; cere and feet greenish yellow.

Total length, female 12 to 14 inches; wing 8 to 9 inches; tail 5 to 5½ inches. Male, total length, 10 to 11 inches; wing 7½ to 8 inches; tail 5 inches.—*Baird's B. B. N. A.*

Habitat.—The whole of North America, south to the West Indies and northern South America.

This little falcon, a native of northern latitudes, occurs in Pennsylvania as a rather rare and irregular visitor during the late fall, winter and early spring months. When found here the Pigeon Hawk is usually seen singly, sometimes a pair are observed together searching food. The species appears to be oftener met with in the mountainous and wooded districts than elsewhere in the state. In the few examinations which I have made of these hawks, only the remains of birds—common pigeons and sparrows—have been detected. From my observations in the field, as well as dissections, I believe the Pigeon Hawk during its residence in this locality preys mainly on various small birds. The following is taken from my note-book in relation to a pair of these hawks: "Two Pigeon Hawks during the late fall lurked about the southern suburbs of the borough of West Chester, preying at regular intervals on the pigeons of a blacksmith. In one week the hawks killed or drove away fifty of these birds. The hawks would enter the boxes and take from them the pigeons."

Falco sparverius LINN.

American Sparrow Hawk.

DESCRIPTION (*Plate 16; Fig. 2, female; Fig. 3, male*).

This common little falcon can easily be recognized by comparison with figures on plate.

Length 10 to 12 inches; extent of wings 18 to 23 inches.

Habitat.—Whole of North America, south to northern South America.

This well-known little hawk is the smallest and most beautiful of the family *Falconidæ*. It is a resident, but is more numerous during fall and winter than at other seasons. Unlike other of our native hawks, it sometimes rears two broods in a season. The Sparrow Hawk builds no nest, but deposits her eggs—numbering from five to seven, rarely the latter number—in hollow trees, selecting usually the deserted hole of a woodpecker. The eggs, nearly spherical, measure about 1.33 by 1.13 inches, and are of a whitish or pale yellow brown color, blotched all over with dark brown. Oviposition occurs in April. Occasionally, if the eggs are taken, the bird will a second time deposit eggs in the same nest. When the young or eggs are disturbed the parent birds will sometimes defend invasion of their domicile with great temerity. Some few years ago I was endeavoring to secure the young from a nest of this species. I had climbed the tree to the aperture, about thirty-five feet from the ground, wherein were snugly packed five young, one of which I removed, when both old birds assailed me. They several times struck my head and arms with their talons and wings. So persistent were their attacks that I, desiring to obtain the young alive, directed a companion, who stood near by, to shoot both birds. I have repeatedly taken the eggs and young of this species, but never, only in the above-cited instance, encountered such determined opposition. When reared from the nest, this species will soon become attached to its master. I raised two, which were given their freedom. Both birds would come at my call and alight on my outstretched arm or shoulders, anxiously waiting for a grasshopper or piece of meat, which was always their recompense. This hawk will resort for several consecutive years to the same tree for breeding purposes. From Doctor Wood's "*Birds of Connecticut*," the following remarks, with regard to the nesting of this bird, are taken:

"One of my collectors found a nest of four eggs in the top of a stump, about ten feet from the ground. This nest was composed of grass, and was discovered by the grass protruding through a crack in the stump. Whether this hawk constructed this nest, or whether it had been made by some other bird, it is impossible to tell; but if this hawk constructs no nest, as asserted by Doctor Brewer and others, it must have obtained it piratically, as the nest was new. In another instance, which occurred in Granby, Connecticut, the nest was known to have been obtained in this way: A farmer made a dove-house inside of his barn, with holes

Cardinal Grosbeak.

1. Male; 2. Female.

through the sides of the building communicating with it. A pair of doves that had mated there were attacked and killed by a pair of Sparrow Hawks, who took possession of their nest, laid four eggs, and commenced incubating."

Incubation, which lasts for about a period of from twenty-one to twenty-four days, is engaged in by both birds, and while one is sitting its mate supplies it with food. When first hatched the young are covered with a white down. The food of young, while under parental care, I have found to consist chiefly of insects.

H. W. Henshaw says: "Its food consists chiefly of the various kinds of coleopterous insects and grasshoppers, of which it destroys multitudes; in fact, this last item is the most important of all, and where these insects are abundant I have never seen them recourse to any other kind of food."

Allen, in his "Ornithological Notes on the Birds of the Great Salt Lake Valley," says: "The Sparrow Hawk, however, was by far the most numerous of the *Falconidæ;* thirty were seen in the air at one time near the mouth of Weber cañon, engaged in the capture of the hateful grasshoppers, which seems at this season to form the principal food of this and other birds." Audubon mentions that he had one of these birds tamed. It was allowed its liberty. "In attempting to secure a chicken one day, the old hen attacked him with such violence as to cost him his life." Doctor Wood says: "When they cannot readily procure their favorite food, mice and small birds are greedily devoured; and, according to a writer in the *American Naturalist,* they are not wholly devoid of the piratical habits of the Bald Eagle. 'A tame cat was crossing the street and bearing a large mouse in her mouth; a Sparrow Hawk came flying over, and seeing the mouse in her mouth, made a sudden swoop and tried to seize it with its talons, but did not succeed. The hawk continued its attempts until they reached the opposite side of the street, when the cat disappeared under the sidewalk.' If it catches a mouse that proves to be lousy and poor, it will leave it and seek another." The stomach contents of sixty-five of this species which I have dissected showed, in thirty-one, principally field-mice, with frequent traces of various insects; twenty-three, mainly grasshoppers and beetles; seven, small birds; two, meadowlarks; one, remains of mouse and small bird; one, insects and small bird.

SUBFAMILY **PANDIONINÆ**. OSPREYS.

GENUS **PANDION** SAVIGNY.

Pandion haliaëtus carolinensis (GMEL.).

American Osprey; Fish Hawk.

DESCRIPTION (*Plate 80*).

Wings long and pointed; second and third quills longest. Three first primaries emarginate on inner webs; bill stout with a very long hook and sharp end; feathers oily to resist water, those of head lengthened and pointed; thighs and little of the front parts of tarsi are covered with short feathers which lie close; legs, tarsi, and feet very strong and robust; claws all same length, very large and sharp. The tarsus all round covered with rough scales; toes padded below and covered with numerous hard-pointed projections to aid in holding their slippery prey.

Adult.—Upper parts dark brown or grayish-brown; most of head, neck and under parts white (chest in female, and sometimes in male, is spotted with brown,) the tail, usually paler than the back, is tipped with white, and has six or seven dusky bars. The young, very similar to adults, have upper parts spotted with pale reddish-brown or white. Iris in some specimens reddish, but mostly yellow; bill and claws blue-black; tarsi and toes grayish-blue. Length (female) about 25 inches; extent about 52.

Habitat—North America, from Hudson's bay and Alaska south to the West Indies and northern South America.

The Fish Hawk, although most numerous about the sea coast, is quite frequently met with along our large rivers. This bird arrives in Pennsylvania generally about the last week in March, and remains sometimes as late as the first of November. Although the Fish Hawk commonly rears its young along the sea coast, it is frequently found breeding near the borders of large rivers or in the vicinity of large inland lakes. The nest, a particularly bulky structure (from four to eight feet in diameter), composed chiefly of sticks, and lined with sea-weeds, grasses, etc., is built usually on a large tree, near the water. In Florida I have found eggs and young of this bird early in March. The Fish Hawk breeds in Pennsylvania. I am informed that about eight years ago Messrs. William Ingram and Joseph Price, of West Chester, Pa., discovered a nest and young of the Fish Hawk along the Brandywine creek, in the vicinity of Chadd's Ford, Delaware county. The eggs, two or three in number, measure about $2\frac{1}{2}$ inches in length by $1\frac{3}{4}$ inches in width; they are yellowish-white, thickly covered with large blotches of different shades of brown. Although it is asserted by certain reputable writers that during the breeding season these birds subsist in part on reptiles and batrachians, I believe that such food is only taken when they are unable to secure fish, which they are so expert in catching. In the stomachs of eighteen Fish Hawks, killed in Pennsylvania, New Jersey, Maryland and Florida, I found only the remains of fishes.

The following list shows that the osprey breeds more or less regularly in different localities in Pennsylvania in the vicinity of large

streams. No person other than those named below make any mention of this species in the reports received by me from other counties:

COUNTY.	OBSERVERS.	REMARKS.
Allegheny,	Dr. T. Z. Hazzard,	Straggler.
Bradford,	J. L. Camp,	Breeds.
Berks,	D. F. Keller,	Breeds.
Chester,	W. M. Swayne,	Rare migrant in vicinity of Kennett Square.
Do.	Alfred P. Lee,	Breeds within a few miles of Oxford.
Do.	B. H. Warren,	Common in spring, late summer and fall; never found nest.
Clinton,	Dr. W. Van Fleet,	Migrant, spring and fall.
Crawford,	H. C. Kirkpatrick,	Rare migrant.
Dauphin,	W. W. Stoey,	Breeds.
Erie,	G. B. Sennett,	Migrant.
Lehigh,	J. F. Kocher,	Breeds.
Luzerne,	Dr. W. L. Hartman,	Migrant.
Lancaster,	Dr. A. C. Treichler,	Breeds occasionally along Susquehanna.
Do.	W. H. Buller,	Breeds occasionally along Susquehanna.
Lackawanna,	H. W. Williams,	Rare migrant.
Do.	Geo. P. Friant,	Straggler.
Lycoming,	August Kock,	Migrant.
Mercer,	S. S. Overmoyer,	Rare visitor; shot one September 4, 1885.
Montgomery,	Thos. S. Gillin,	Migrant.
Do.	W. P. Bolton,	Migrant; probably breeds.
Northampton,	O. B. Hark,	Migrant.
Do.	Dr. J. W. Detwiller,	Have found it breeding in Pennsylvania.
Perry,	H. J. Roddy,	Breeds.
Philadelphia,	Witmer Stone,	Occasional migrant.
Do.	G. S. Morris,	Migrant.
Do.	H. Jamison,	Occasional migrant.
Do.	Jos. P. Ball,	Occasional migrant.
Do.	Rev. Jos. Johnson,	Occasional migrant.
Sullivan,	Otto Behr,	Migrant.
Susquehanna,	Dr. H. A. Tingley,	Breeds.
Do.	Geo. B. Perry,	Migrant.
Washington,	M. Compton,	Straggler.
Do.	W. T. Warrick,	Straggler.
Do.	Jas. S. Nease,	Rare visitor.
Wyoming,	V. A. Beemer,	Breeds regularly.
Wayne,	N. F. Underwood,	Migrant.
York,	Geo. Miller,	Breeds along the Susquehanna.
Do.	Casper Loucks,	Breeds along the Susquehanna.
Do.	Hon. G. C. Brown,	Breeds along the Susquehanna.

SUBORDER STRIGES. OWLS.

THE OWLS.

Ten representatives of the families *Strigidæ* and *Bubonidæ* are found in Pennsylvania. Some are common residents in all parts of the state; others breed in boreal regions and are found with us as irregular or accidental winter visitants. The little Screech Owl, dressed in his coat of red, or gray, or a mixture of both, is one of the most common and best known birds of this group. He is found in cities and towns as well as in the rural districts; and in the hollow limbs of trees in old apple orchards he delights to conceal himself in daylight, and also to rear his family. He often is found about barns and other buildings, where he goes in the daytime to hide, or frequently at night, to catch mice, one of his main articles of livelihood. The Great Horned Owl inhabits the woods, but on the approach of night he goes out in quest of food. His visits to the poultry yard are so common that he, also, is familiar to residents of the country, where he is usually known, from his loud cries, as "Hoot Owl." The Barn Owl, a southern bird, breeds sparingly, and most frequently in the southern parts of the commonwealth. The Snowy Owl, which breeds in the Arctic regions, is found here only as an irregular winter sojourner. Some persons, not versed in ornithological matters, name both the Snowy Owl (*N. nyctea*) and Barn Owl (*S. pratincola*) "White" or "Snowy" Owls. Such local names, used to designate the Barn Owl, are confusing and should be discarded. Owls, other than the Long eared and Short-eared species, are usually observed singly; those that breed here, of course, are often, during the breeding period, seen in pairs, and with their young. In winter Long-eared and Short-eared Owls are found generally in flocks.

Long-eared Owls breed in many localities, in fact quite generally, throughout the state, and owing to the circumstance that sometimes they roost, in the daytime, in cedar trees, they are termed by many "Cedar" Owls. The Short-eared Owls frequent meadows, swamps and grassy fields. Hunters who most frequently come across them know them as "Marsh" or "Swamp" Owls. The Short-eared owl is common in winter, and is said to breed here in rare instances. The Barred Owl is a resident and breeds generally throughout the state; it is most numerous in the mountainous and wooded districts. In different parts of Wayne, Susquehanna and Wyoming counties, where the Barred owl is common, it is called "Rain Owl." To distinguish an owl from a hawk remember the owl's eyes are situated in the *front* of the head and look forward, while the hawk's eyes are directed to *either side.* The extremely soft and downy plumage of these birds is such that their flight is almost noiseless. During the daylight we ,usually, find them concealed in hollow trees, or dense foliage, preferably cedar thickets. While it is generally an accepted fact that owls are nocturnal in their habits, it is not true that they are exclusively so. The Short-eared and Barred Owls are of a decidedly diurnal nature; and in cloudy weather or in early twilight it is not unusual to see the Great Horned Owl sally forth in quest of prey. Birds of this suborder, unlike certain other species of the *Raptores*, never, it is stated, unless reduced to the utmost extremity, feed on carrion, but subsist on such food as they are able to kill. Their dietary, although variable with locality and circumstances, consists mainly of small quadrupeds (principally field mice), insects, chiefly beetles and grasshoppers, and some few of the smaller kinds of birds. "Many species are capable of living without water for months at a time, though some of them drink it readily and often bathe freely." Benjamin M. Everhart, the well-known Pennsylvania botanist, had in captivity, for a period of about two years, a Great Horned Owl, and during this time he says it never would drink water. The owls, like many other birds of prey, eject from the mouth, in small ball-like masses, the indigestible portions of their food, such as hair, bones, etc. These little balls or pellets, as they are usually called, are frequently to be found in great quantities about localities where these birds resort during the daytime. The eggs are white, nearly round, and commonly number from three to five; deposited generally in hollow trees or the deserted nests of hawks and crows. Their cries are loud and dismal.

The general form of Owls, is short and heavy; the head and eyes are usually very large; bill very much like a hawk's, but never toothed, and often almost hidden by long bristle-like feathers; eyes encircled by a ring of radiating bristly feathers; tarsi, and in most species toes, also densely feathered. In some species the heads are furnished with long erectile tufts of feathers, which are commonly called horns; ears in some species remarkably large.

Family **STRIGIDÆ.** Barn Owls.

Genus **STRIX** Linnæus.

Strix pratincola Bonap.

American Barn Owl.

Description (*Plate 17*).

Length of female about 16 inches; extent of wings about 43 inches. Male rather smaller; no ear tufts; facial disc well developed but not circular; eyes blackish-blue and rather small; lower part of long tarsus has short stiff feathers; toes nearly naked, but with some hair-like feathers; feathers of body downy. Colors brownish, ashy and white.

Habitat.—Warmer parts of North America, from the middle states, Ohio valley, and California southward through Mexico.

The Barn Owl has of late years become rather rare in various sections of Pennsylvania, where formerly, it is said, to have been quite plentiful. I have never found this species breeding in eastern Pennsylvania. Prof. Gentry, however, who has been more fortunate, says: "In the selection of a place for nesting purposes, these owls vary in different localities. In eastern Pennsylvania generally a hollow tree, chiefly an apple or an oak is chosen, but, occasionally, a dilapidated and unoccupied barn; but more rarely, an occupied building in close proximity to man. When the former situations are chosen, the hollow is lined with a few dried grasses and feathers, although instances are not unfrequently met with where the eggs are deposited upon the bare bottom. In the latter places a few rude sticks constitute a framework which is lined with a few fine grasses and feathers. It is deposited upon a short timber in a somewhat inaccessible part of the building. Nesting ordinarily takes place early in March, although we have observed newly-built nests in the latter part of February. Oviposition commences about the second week of March. The number of eggs laid varies from three to four, very rarely more. * * * The eggs are somewhat subspherical, scarcely more pointed at one extremity than the other, unless in exceptional cases; of a bluish-white color, and measure 1.67 inches in length, and 1.37 in width. They vary, however, in size in different localities."

The following list gives reports received from all observers who have noted the Barn Owl and reported to me the result of their observations. From this it will be noticed that this owl is found chiefly when breeding in the southern parts of the state.

COUNTY.	OBSERVERS.	REMARKS.
Allegheny. . .	R. C. Wrenshall, . .	Rare breeder.
Do. . .	Dr. T. L. Hazzard, .	Resident; breeds.
Beaver, ...	Dr. G. A. Scroggs, .	Resident; breeds.
Berks, ...	D. F. Keller, ...	Occasional; possibly breeds.
Columbia, . . .	Dr. A. B. MacCrea,	Straggler.
Clearfield, . .	L. D. Balliet, ...	Occasional visitor.
Cumberland. .	T. L. Neff, ...	Resident; breeds.
Crawford. . . .	H. C. Kirkpatrick, .	Straggler.
Chester, ...	A. P. Lee, ...	Breeds occasionally in vicinity of Oxford.
Do. . . .	B. H. Warren, . . .	Probably breeds; birds taken in spring, summer, fall and winter.
Dauphin, . . .	W. W. Stoey, ...	Resident; breeds.
Delaware, . . .	Robert Townsley, .	Breeds.
Fayette, ...	G. W. Linton, . . .	Breeds.
Lehigh, ...	J. F. Kocher, ...	Occasional visitor.
Lebanon, . . .	Geo. R. Ross, . . .	Rare visitor.
Do. . . .	J. G. Bohn, ...	Rare visitor; probably breeds.
Lancaster, . .	H. J. Roddy, ...	Breeds.
Do. . .	Dr. A. C. Treichler,	Resident; breeds.
Do. . .	James Galen, ...	Resident; breeds.
Lackawanna, .	Geo. P. Friant, . . .	Very rare; have received two in ten years.
Mercer, ...	S. S. Overmoyer. . .	Rare visitor.
Montgomery. .	Thos. S. Gillin, . . .	Occasional visitor; nearly extinct.
Northampton,	Dr. J. W. Detwiller,	Took one on meadows near Philadelphia; heard of a pair breeding in a church steeple at Lancaster city.
Philadelphia, .	Witmer Stone, . . .	Occasional visitor.
Somerset, . . .	B. H. Warren. . . .	Saw one January, 1890, near Somerset.
Susquehanna, .	S. S Thomas, . . .	Rare migrant.
Do. .	Geo. B. Perry. . . .	Straggler.
Do. .	Dr. H. A. Tingley. .	Rare visitor.
Venango. . . .	J. R. Robertson. . .	Rare migrant.
Washington. .	Jas. S. Nease, . . .	Straggler; December, 1883.
Do. .	M. Compton.	Occasional visitor; December, 1882.
Do. .	W. T. Warrick, . .	Occasional visitor; December, 1882.
York, ...	Hon. G. C. Brown. .	Breeds.
Do.	Geo. Miller, ...	Straggler.
Do.	Casper Loucks, . . .	Straggler.

These owls subsist principally on mice—especially meadow mice—rats and various insects. Sometimes they catch and devour small birds, but never, I think, molest poultry, either old or young.

In the stomachs of five Barn Owls I found the following food materials:

No.	Date.	Locality.	Food-Materials.
1	April 20, 1879, .	Delaware county, Pa., . .	Mice and fragments of beetles.
2	Nov. 14, 1880, .	Chester county, Pa., . . .	Mice.
3	Oct. —, 1881, .	Chester county, Pa., . . .	Feathers of Sparrow and bones of small mammal.
4	Sept. —, 1882, .	Philadelphia county, Pa., .	Mice.
5	May 21, 1886, .	Chester county, Pa., . . .	Mice.

Family **BUBONIDÆ**. Horned Owls, Etc.

Genus **ASIO** Brisson.

Asio wilsonianus (Less.).

American Long-eared Owl; Cedar Owl.

Description (*Plate 86*).

"Ear tufts long and conspicuous; eyes rather small; wings long; tarsi and toes densely feathered; upper parts mottled with brownish-black, fulvous, and ashy-white, the former predominating; breast pale-fulvous, with longitudinal stripes of brownish-black; abdomen white; every feather with a wide longitudinal stripe, and with transverse stripes of brownish-black; legs and toes pale-fulvous, usually unspotted, but frequently with irregular narrow transverse stripes of dark-brown; eye nearly encircled with black; other feathers of the face ashy-white; with minute lines of black; ear-tufts brownish-black edged with fulvous and ashy-white; quills pale-fulvous at their bases, with irregular transverse bands of brown; interior coverts of the wing pale-fulvous, frequently nearly white; the larger widely tipped with black; tail brown, with several irregular transverse bands of ashy-fulvous, which are mottled, as on the quills; bill and claws dark; irides yellow.

"Total length: Female about 15 inches; extent about 38; wing 11 to 11½; tail 6 inches. Male rather smaller"—*B. B. of N. A.*

Habitat.—Temperate North America.

Owing to the fact that these birds oftentimes conceal themselves during the daytime in cedar trees, the local appellation of "Cedar Owl" has arisen. The Long-eared Owl is a resident and one of the most abundant of all the owl tribe in this state. While owls usually lead a solitary life or associate in pairs, we find the subject of this sketch to be social and gregarious, associating commonly in parties of from twelve to twenty-five individuals. During the winter months, if not molested, they often take up a residence in the dark retreats furnished by the numerous coniferous trees growing around the habitations of man. In relation to a party of these owls Dr. William R. Stavely, Lahaska, Bucks county, Pa., writes me as follows: "For over twenty years I have had congregated in my lawn from fifty to seventy-five owls. They are peaceable and quiet, only on rare occasions would you know one was about. On

Rose-breasted Grosbeak.

1. Males; 2. Female; 3. Young Male.

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dull days and foggy evenings they were flying about in all directions. Never in all that time have I missed any poultry or have they inflicted any injury on anything of value.

"The first I noticed of their presence was the discovery of quite a pile of what appeared to be mice hair and bones, and on investigation found the Norway fir was the roosting place of to me at that time a vast number of owls. They had ejected the bolus of hair and bones apparently of an army of tree-eating destructive mice, aiding the fruit-grower against one of the worst and most inveterate enemies. * * * * Their merits would fill sheets; the demerits nil."

Although it is true that the Long-eared Owls at times do construct their own nests, I am inclined to believe that these birds, in this region at least, prefer to occupy the deserted nests of other birds. I have on several occasions found the Long-eared Owls breeding, and always observed that they occupied the abandoned nests of crows or hawks. Audubon says: "The Long-eared Owl is careless as to the situation in which its young are to be reared, and generally accommodates itself with the abandoned nest of some other bird that proves of sufficient size, whether it be high or low, in the fissure of a rock or on the ground. Sometimes, however, it makes a nest itself; and this I found to be the case in one instance near the Juniata river, in Pennsylvania, where it was composed of green twigs, with the leaflets adhering, and lined with fresh grass and wool, but without any feathers." Of all our owls this species is, without doubt, the most serviceable to the farmer and horticulturist, as it preys almost wholly on field-mice and other destructive little rodents. Unhappily, during the past four or five years there has been a rapid decrease in the number of these birds in many localities in Pennsylvania; this diminution, I judge, is largely due to the fact that the stuffed heads of these harmless and beneficial owls make an attractive ornament for lovely woman's headwear.

The eggs of this bird vary considerably in size; a small example in my possession measures about $1\frac{1}{2}$ by $1\frac{1}{4}$ inches.

Audubon says: "It preys chiefly on quadrupeds of the genus *Arvicola*, and in summer destroys many beetles."

I have examined the stomachs of twenty-three Long-eared Owls and found that twenty-two of them had fed only on mice; the other examination made of a specimen taken in the late spring, showed some beetles and portions of a small bird.

Asio accipitrinus (PALL.).

Short-eared Owl; Marsh Owl; Swamp Owl.

DESCRIPTION (*Plate 86*).

"Ear-tufts very short; entire plumage buff or pale-fulvous; every feather on the upper parts with a wide longitudinal stripe of dark-brown, which color predominates on the back; under parts paler, frequently nearly white on the abdomen, with longitudinal stripes of brownish-black, most numerous on the breast, very narrow and less numerous on the abdomen and flanks; legs and toes usually of a deeper shade of the same color as the abdomen; quills pale reddish-fulvous at their bases, brown at their ends, with wide irregular bands and large spots of reddish-fulvous; tail pale reddish-fulvous, with about five irregular transverse bands of dark-brown which color predominates on the two central feathers; under tail-coverts usually nearly white; throat white; eyes enclosed by large spots of brownish-black; ear-tufts brown, edged with fulvous; bill and claws dark; irides yellow.

Total length: Female, about 15 inches; wing 12; tail 6 inches. Male, rather smaller." *B. B. N. A.*

Habitat.—Throughout North America; nearly cosmopolitan.

The vulgar name of Marsh Owl is quite appropriate, as this species frequents mostly during its sojourn in this region marshy districts and grass fields. Sometimes small parties of five, eight or even ten individuals, will be found in favorite grassy retreats.

According to my observation the Short-eared Owl occurs in Pennsylvania as a tolerably common winter resident, arriving from more northern latitudes, early in November and departing early in April. Turnbull, in his "*Birds of Eastern Pennsylvania*," records it as a winter resident, "not uncommon." The Messrs. Baird speak of it as "abundant; not seen in summer," and Dr. Michener says: "Resident, frequent in winter; rare in summer." Audubon found a nest of this owl in Pennsylvania on one of the high mountain ridges of the Great Pine Forest, on June 17. In reference to this "find" he writes: "It contained four eggs, nearly ready to be hatched. They were of a dull bluish-white, of a somewhat elongated or elliptical form, measuring an inch and a half in length, and an inch and an eighth in breadth. The nest was placed under a low bush, and covered over by tall grass, through which a path had been made by the bird. It was formed of dry grass, raked together in a slovenly manner and quite flat, but covering a large space, on one side of which were found many pellets and two field mice. I should never have discovered their nest had not the sitting bird made a noise by clicking its bill as I was passing close by. The poor thing was so intent on her task that I almost put my hand on her before she moved; and then, instead of flying off, she hopped with great leaps until about ten yards from me, keeping up a constant clicking of her mandibles. Having satisfied myself as to the species, made an outline of two of the eggs and measuring them, I proceeded slowly to a short distance and watched her movements. Having remained silent and still for about ten minutes, I saw her hop toward the nest, and soon felt assured she had resumed her task."

L. M. Turner, the Arctic explorer, in his "*Contributions to the Natu-*

ral History of Alaska," says: "Among the natives of the Yukon district the liver of this bird is used as a love-philter. The liver is dried and reduced to a powder, and placed, unknown to the person to whom the philter is to be administered, in some food. On eating the food the desired affection is supposed to make itself evident. I knew of an incident where a native endeavored, by this means, to regain the affection of his wife. The mother-in-law had more potency than dried owl-liver, and as she controlled her daughter the philter was as naught. It is administered indifferently, by man or woman, and is frequently used by the Eskimo."

From the following list it will be observed that this owl very seldom is found breeding in this state:

COUNTY.	OBSERVERS.	REMARKS.
Bradford,	J. L. Camp.	Winter visitor.
Do.	A. T. Lilley,	Migrant.
Berks,	Jonas Stern,	Migrant in winter.
Do.	D. F. Keller,	Winter visitor.
Bucks,	S. Edward Paschall,	Winter visitor.
Clinton,	Dr. Van Fleet,	Migrant.
Chester,	B. H. Warren,	Winter resident.
Dauphin,	W. W. Stoey,	Migrant; possibly breeds.
Erie.	G. B. Sennett,	Migrant.
Lycoming,	A. Kock,	Migrant; possibly breeds.
Lackawanna,	G. P. Friant,	Winter visitor.
Lehigh,	J. F. Kocher,	Migrant.
Lancaster,	Dr. A. C. Treichler,	Common in winter; breeds occasionally.*
Lebanon,	Geo. R. Ross,	Winter visitor.
Montgomery,	Thomas S. Gillin,	Common in winter.
Northampton,	O. B. Hark,	Winter resident.
Do.	Dr. J. W. Detwiller,	Migrant.
Perry,	H. J. Roddy,	Migrant.
Philadelphia,	Rev. Joseph Johnson,	Winter visitor.
Do.	J. P. Ball,	Migrant.
Venango,	J. R. Robertson,	Migrant.
Washington,	J. S. Nease,	Winter visitor.
Do.	M. Compton,	Winter visitor.
Do.	W. T. Warrick,	Winter visitor.

Nuttall says: "Its food is almost exclusively mice, for which it watches, seated on a stump, with all the vigilance of a cat, listening attentively to the low squeak of its prey, to which it is so much alive as to be sometimes brought in sight by imitating the sound." In the disgorged pellets of this species examined by Audubon, he found the remains of bones of small quadrupeds, mixed with hair, and remains of various beetles.

The food of eleven of these owls examined by me will be found in the following table:

NO.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	Jan. 4, 1880,	Chester county, Pa.,	Field mice.
2	Jan. 5, 1880,	Chester county, Pa.,	Field mice.
3	Mar. 17, 1882,	Purchased at Philadelphia Market.	Field mice.
4	Nov. 13, 1883,	Delaware county, Pa.,	Field mice.
5	Nov. 7, 1883,	Cecil county, Md.,	Field mice.
6	Nov. 1, 1885,	Chester county, Pa.,	Beetles and field mice.
7	Mar. —, 1886,	Chester county, Pa.,	Beetles and field mice.
8	Nov. 21, 1886,	Chester county, Pa.,	Field mice.
9	Nov. 25, 1886,	Chester county, Pa.,	Field mice.
10	Nov. 27, 1886,	Chester county, Pa.,	Field mice.
11	Dec. 8, 1886,	Chester county, Pa.,	Field mice.

"* I have found the Swamp or Short-eared Owl at all times of the year in the Conewago Valley; this leads me to believe that it breeds here, sometimes, or at least on the Blue mountains, in the vicinity of Colebrook and Mt. Gretna."—*Treichler.*

Genus **SYRNIUM** Savigny.

Syrnium nebulosum (Forst.).

Barred Owl; Rain Owl.

Description (*Plate 87*).

"Head large, without ear-tufts; tail rather long; upper parts light ashy-brown, frequently tinged with dull-yellow, with transverse narrow bands of white, most numerous on the head and neck behind, broader on the back; breast with transverse bands of brown and white; abdomen ashy-white, with longitudinal stripes of brown; tarsi and toes ashy-white, tinged with fulvous, generally without spots, but frequently mottled and banded with dark-brown; quills brown, with six or seven tranverse bars, nearly pure-white, on the outer webs, and ashy-fulvous on the inner webs; tail light brown, with about five bands of white, generally tinged with reddish-yellow; discal feathers* tipped with white; face ashy-white, with lines of brown, and a spot of black in front of the eye; throat dark-brown; claws horn-color; bill yellow; irides bluish-black. Sexes alike.

Total length about 20 inches; extent about 44; wing 13 to 14; tail 9 inches." B. B. N. A.

Habitat.—Eastern United States, west to Minnesota and Texas, north to Nova Scotia and Quebec.

The Barred Owl is readily distinguished from other species by its large size, yellow-colored bill and its black eyes. Barred Owls are exceedingly abundant in many of the southern states, where they are known by the names of "Hoot and Swamp Owls." In Pennsylvania this owl is found all months of the year, and in many of the mountainous and heavy-wooded regions it is the most common of all the owls. The Barred Owl lays its eggs in a hollow tree, or in a deserted nest of a hawk or crow; the white eggs are a little under 2 inches long by about $1\frac{3}{4}$ wide. The Barred and Great Horned Owls are the only species, in this locality, whose depredations in the poultry yard bring them to the notice of the farmer. Unfortunately, however, the hatred towards these two birds, and particularly the enmity against the Great Horned Owls, has brought all our owls in bad favor; the farmer's boy and sportsman, with few exceptions, let no opportunity pass to pillage an owl's nest or slay its owners. In this way, there are annually destroyed large numbers of the Screech, Long-eared and Short-eared species, simply because the popular idea is that owls, large and *small*, prey only on poultry and game.

Wilson says, although mice and small game are the most usual food of Barred Owls, they sometimes seize on fowls, partridges and young rabbits.

"The Barred Owl subsists principally upon small birds, field mice and reptiles. He is frequently seen, in early twilight, flying over the low meadow lands, searching for the mice that dwell there; he usually takes a direct course, and sometimes flies so low that the tips of his wings seem to touch the grass. When he discovers his prey he drops

* Radiating feathers surrounding the eyes.

Indigo Bunting.

1, 2, 3. Males in different stages of Plumage; 4. Female.

on it instantly, folding his wings and protruding his feet, in which his quarry is always secured; he often captures frogs that are sitting on the shores of ponds and rivers; but I am inclined to think that the statement, quoted by Audubon, that he often catches fish, is incorrect."—*Samuels.**

The Florida Barred Owl—a local race, technically called *Syrnium nebulosum alleni*—is exceedingly abundant about the almost impenetrable swamps and heavily-timbered regions along the St. John's river. In the winter of 1885, I was informed by two residents of Florida, both gentlemen whom I consider thoroughly trustworthy, that this owl frequently preys on fish, which it secures, while sitting close to the water's edge, by a dextrous movement of the foot. The stomach contents of five of these Florida Owls, which I examined, consisted only of the remains of small birds and coleopterous insects.

Referring to this species, Nuttall says: Their food is principally rabbitts, squirrels, grouse, quails, rats, mice and frogs. From necessity, as well as choice, they not unfrequently appear around the farmhouse and garden, in quest of poultry, particularly young chickens. At these times they prowl abroad toward evening, and fly low and steadily about, as if beating for their prey.

The stomach contents of eight of these owls which I have examined are recorded in the following table:

No.	Date.	Locality.	Food-Materials.
1	Oct. 28, 1879. . . .	Chester county, Pa., . .	Field mice and beetles.
2	Nov. 17, 1879. . . .	Chester county, Pa., . .	Beetles and small bird (Robin).
3	Jan. —, 1880. . . .	Chester county, Pa., . .	Field mice.
4	Jan. 11, 1881. . . .	Chester county, Pa., . .	Remains of chicken and field mice.
5	Jan. 20, 1883. . . .	Chester county, Pa., . .	Field mice and small bird (Meadowlark).
6	Jan. 12, 1884. . . .	Chester county, Pa., . .	Beetles and chicken feathers.
7	Dec. 16, 1886. . . .	Chester county, Pa., . .	Remains of rabbit (*Lepus*).
8	Nov. 18, 1887. . . .	Cecil county, Md., . . .	Fragments of beetles and bones of small mammal.

Genus **ULULA** Cuvier.

Ulula cinerea (Gmel.).

Great Gray Owl.

Description.

A very large round-headed owl, without ear tufts; although much larger, resembles somewhat the Barred Owl, but can be easily distinguished from the latter.

Length (female) 28; extent about 56; wing 17, tail 12; bill and eyes yellow; claws long and very sharp and dusky. Above dark-brown, feathers variously spotted, mottled or barred with fine grayish-white markings; lower parts similar but more grayish, with longitudinal streaks on breast, and cross bars of white and dusky on flanks; face grayish-white with numerous narrow rings of dusky; a patch of black about eyes on either side of bill.

Habitat.—Arctic America, straggling southward in winter, to the northern border of the United States.

* Our Northern and Eastern Birds, by E. A. Samuels, p. 74.

This owl, one of the largest, if not *the* largest in North America, is found in Pennsylvania only as a very rare and irregular straggler in winter. Twenty or more years ago a specimen was captured in Chester county in midwinter by H. B. Graves. About eight years ago Dr. I. F. Everhart, of Scranton, found one dead in the mountains in Lackawanna county. Mr. Geo. B. Sennett tells me one was found a few years ago in the smoke stack of a steamboat at Erie city. Geo. B. Perry, Susquehanna county, and H. J. Roddy, Perry county, also mention this owl as a straggler.

GENUS **NYCTALA** BREHM.

Nyctala acadica (GMEL.).

Acadian Owl; Saw-whet Owl.

DESCRIPTION (*Plate 87*).

"Small; wings long; tail short; upper parts reddish-brown, tinged with olive; head in front with fine lines of white, and on the neck behind, rump, and scapulars, with large, partially concealed spots of white; face ashy-white; throat white; under parts ashy-white, with longitudinal stripes of pale reddish-brown; under coverts of wings and tail white; quills brown, with small spots of white on their outer edges, and large spots of the same on their inner webs; tail brown, every feather with about three pairs of spots of white; bill and claws dark; irides yellow.

Total length about 7½ to 8 inches; extent about 18; wing 5½; tail 2¾ to 3 inches. Sexes nearly the same size and alike in colors."—*B. B. of N. A.*

Habitat.—North America at large; breeding from Middle States northward.

The Acadian is the smallest owl found in the United States east of the Mississippi river. Although apparently larger, it is in reality smaller, than our common robin. This pigmy mass of owl-life is, I suppose, the species which was regarded as not destructive to poultry and game, by the author of the "Scalp Act," when he introduced therein a clause exempting "The Arcadian Screech or Barn Owl." From the fact, however, that the decapitated heads of pheasants,* nighthawks, chickens, cuckoos, shrikes, and doubtless other birds, were cremated and paid for as the heads of destructive, rapacious "hawks," it is but reasonable to suppose that our little Acadian Owl, when found by the eager scalp hunter, was generally slain, and the bounty of fifty cents given "for the benefit of agriculture and for the protection of game."

The name Saw-whet is applied to this bird because, at times, its squeaky voice resembles the wheting or filing of a saw. Owing to the small size of this owl, together with the fact that during the daytime it remains secreted in hollow trees, thick foliage or in dark and secluded

*In December, 1886, Prof. S. F. Baird informed me that he had received for identification, from several counties in Pennsylvania, the heads of Pheasants (*Bonasa umbellus*). These heads were called by the parties sending them to Prof. Baird "Hawk heads," and as such they had been presented for the fifty-cent bounty, which had been paid. Prof. Baird also examined some Pennsylvania "wolf scalps," on which premiums had been given, and ascertained that the so-called "wolf scalps" had been fashioned from pelts of the common Red Fox (*Vulpes fulvus*).

Scarlet Tanager.

1. Male; 2. Female.

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rocky retreats, it is seldom met with, hence is regarded as one of our rarest residents. The young of this bird, taken in the vicinity of Philadelphia, have been seen by Prof. Gentry, and in E. A. Samuel's work, "*Our Northern and Eastern Birds,*" the following interesting account is given by Richard Christ of a nest that he found April 25, 1867, at Nazareth, Pennsylvania:

"This, the smallest of all our owls, is also the most rare, but a single specimen being seen in a period of several years. It is very tame when found, permitting one to approach very close to it before flying away. I am inclined to think that it sees less in the daytime than any other species of our owls, for one can touch it without being noticed, the bird taking flight more from alarm to its sense of hearing than any other cause.

"It generally frequents stone quarries or piles of rocks, beneath which it takes shelter; and it is from this habit that the bird here is known by the name of 'Stone Owl.' On the 25th of April, 1867, I was so fortunate as to find the nest of one of these birds. It was placed or located in the hollow of a tree, about twenty feet from the ground; the entrance to the hole was very small, scarcely two inches in diameter. On climbing the tree and looking in the hollow, I discovered sitting on the bottom what I supposed might be a small owl. Uncertain as to the truth, I introduced a small stick into the hole, and turned the bird over upon her side, she making no struggle whatever, but remaining perfectly still as if dead. I discovered that she was sitting upon a single egg. Supposing that she had but just commenced laying, I left her, and did not molest her again for several days; on the fifth day after I again examined the nest, and found the bird on her egg, none other having been laid. I enlarged the hole, and took the egg, leaving the owl quietly sitting on the rotten chips which formed the bottom of the nest.

"The egg was white with a bluish tint, like many of the other owls' eggs, nearly globular in form, and considerably smaller than the egg of the Red or Mottled Owl."

Dr. Elliott Coues, in his "*Birds of the Northwest,*" says: "Mr. Gentry informs me of a curious circumstance in regard to this owl. Referring to the association of the Burrowing Owl of the west with the prairie dog, he continues: 'In the hollow of an oak tree, not far from Germantown, lives an individual of the common chickaree squirrel (*Sciurus hudsonius*), with a specimen of this little owl as his sole companion. They occupy the same hole together in perfect harmony and mutual good-will. It is not an accidental, temporary association, for the bird and the squirrel have repeatedly been observed to enter the same hole together, as if they had always shared the apartment. But what benefit can either derive from the other?'"

Mr. Otto Behr writes me as follows of this species: "The Acadian Owl is quite common here (Lopez, Sullivan county), though not often

seen; the young leave the nest about the first week in May. They make a noise which sounds like a dog "sniffing" the air. The noise gave me quite a start the first time I heard it. It being at night in heavy timber, and as it seemed to come from overhead somewhere, I supposed it was a bear or some such animal up a tree near by."

This little owl, although sometimes known to prey on small quadrupeds, principally mice, and at times on small birds, such as sparrows and warblers, subsists mainly on the larger species of insects which it is able to secure in its nocturnal wanderings.

The stomach contents of seven of these owls, which I have examined, are given in the following table:

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	Aug. 30, 1879.	Chester county, Pa.,	Grasshoppers.
2	Nov. 11, 1881.	Delaware county, Pa.,	Beetles.
3	Nov. 10, 1883.	Chester county, Pa.,	Grasshoppers.
4	Nov. 10, 1883.	Chester county, Pa.,	Beetles and other insects.
5	Sept. 20, 1884.	Chester county, Pa.,	Mouse and insects.
6	July —, 1887.	Venango county, Pa.,	Beetles.
7	Dec. —, 1889.	Elk county, Pa.,	Mouse and spider.

GENUS **MEGASCOPS** KAUP.

Megascops asio (LINN.).

Screech Owl; Red Owl; Mottled Owl; Gray Owl.

DESCRIPTION (*Plate 18*).

Adult or young Screech Owls may be either red or gray in color. The nestlings are white. This species measures about 10 inches in length; extent of wings about 22 inches.

Habitat.—Temperate eastern North America, south to Georgia and west to the plains. Accidental in England.

This handsome little owl is the most common of all owls found in Pennsylvania. It is resident, but, unlike the long-eared species, is not gregarious. Its almost spherical and white eggs—four to six in number (mostly four)—are deposited in a hollow tree. A tree in an apple orchard is frequently made use of for breeding purposes, as well as a common diurnal resort at all seasons. The eggs measure about 1.33 by 1.18 inches. This bird, when taken from the nest and raised, makes a very interesting pet, one that not only becomes attached to its master, but which also is capable of rendering him most efficient services in the destruction of mice, whose vexatious ravages are frequently so annoying. Some few years ago an acquaintance of mine placed two of these birds in his cellar which was overrun with mice, and in a few weeks the place was depopulated of these little four-footed pests.

A Screech Owl which I kept for several months in captivity fed eagerly on grasshoppers and pieces of fresh beef. When a mouse was given to this bird it would seize it with its claws, and after severing

with its bill the skin about the head and neck, would swallow the whole mass, always, I think, head foremost. When it fed on small birds—which were frequently shot and placed in its box—but which it would seldom touch, I noticed that it generally tore open the skull and ate the brain substance. This owl would never drink water.

"The flight of the Mottled Owl is smooth, rapid, protracted and noiseless. It rises at times above the top branches of the highest of our forest trees whilst in pursuit of large beetles; and at other times sails low and swiftly over the fields, or through the woods, in search of small birds, field mice, moles or wood rats, from which it chiefly derives its subsistance. Sometimes on alighting, which it does plumply, the Mottled Owl immediately bends its body, turns its head to look behind it, performs a curious nod, utters its notes, then shakes and plumes itself, and resumes its flight in search of prey. It now and then, while on the wing, produces a clicking sound with its mandibles, but more frequently when perched near its mate or young. This I have thought was done by the bird to manifest its courage, and let the hearer know that it is not to be meddled with; although few birds of prey are more gentle when seized, as it will suffer a person to touch its feathers and caress it without attempting to bite or strike with its talons, unless at rare intervals.

"The notes of this owl are uttered in a tremulous, doleful manner, and somewhat resemble the chattering of the teeth of a person under the influence of extreme cold, although much louder. They are heard at a distance of several hundred yards, and by some people are thought to be of ominous import."

"The little fellow is generally found about farm-houses, orchards and gardens. It alights on the roof, the fence or the garden gate, and utters its mournful ditty, at intervals, for hours at a time, as if it were in a state of great suffering, although this is far from being the case—the song of all birds being an indication of content and happiness. In a state of confinement it utters its notes with as much satisfaction as if at liberty. They are chiefly heard during the latter part of winter—that being the season of love, when the male bird is particularly attentive to the fair one, which excites his tender emotions, and around which he flies and struts much in the manner of the common pigeon, adding numerous nods and bows, the sight of which is very amusing."—*Audubon.*

The following interesting account of the methods employed by an enthusiastic oölogist is taken from a letter written to me, October, 1889, by Mr. O. B. Hark, of Bethlehem: "Have you ever heard of fixing holes for Sparrow Hawks and Screech Owls? Mr. John Mack, the best climber I ever met, every spring cleans out old holes, enlarges such as are too small, etc., and finds it pays him well; this spring he got ninety Sparrow Hawk eggs and every one was taken out of holes fixed by him; at one time he put the leg of an old rubber boot in a hollow tree and

several weeks later took a batch of Screech Owl's eggs out of it. Another singular experience he had with owls is, he made a hole in a willow tree; when he came to look after it again he found owls had taken possession of it and had nearly filled it with field mice; he said there were enough mice in it to fill his derby hat. This happened just before a heavy snow storm and about ten days later every mouse was gone."

Mr. L. M. Turner informs me that he has made a number of examinations of Screech Owls captured in Illinois, and very generally found their food consisted of such insects as the larger beetles and grasshoppers, also many mice. Grasshoppers and other orthopterous insects are devoured in large quantities by these birds.

During the summer months and at other times when insect life is abundant the Screech Owls subsist mainly on an insect diet. These birds also prey* on mice, shrews, other small quadrupeds and small birds. In the twenty-seven stomach examinations, which I have recorded, of birds taken principally in the winter season, seventeen had fed on mice and insects; five, small birds; three, mice and insects; two, small birds and insects.

GENUS **BUBO** CUVIER.

Bubo virginianus (GMEL.).

Great Horned Owl; Hoot Owl.

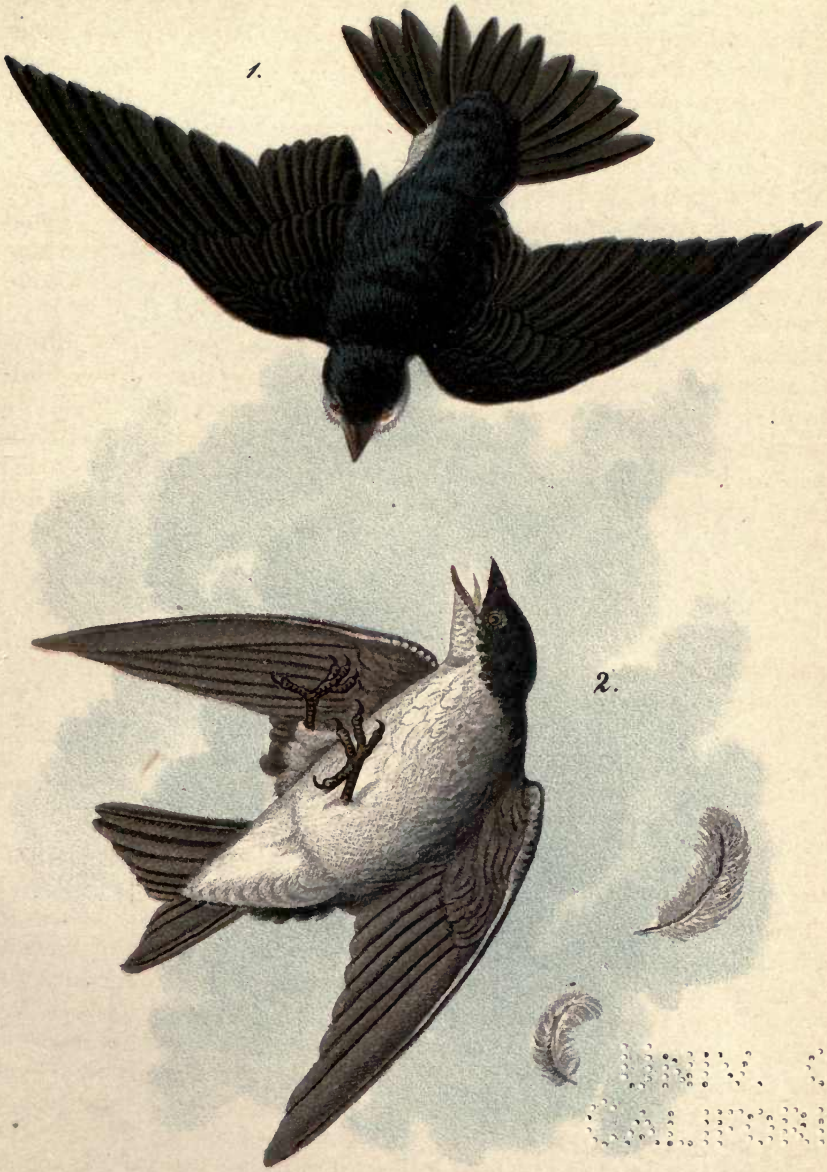
DESCRIPTION (*Plate 19*).

Length (female) 21 to 24 inches; extent about 5 feet; tail about 9 inches; male 19 to 23 long; extent about 50 to 53 inches. Can be distinguished by its large size and long ear-tufts. Plumage blackish, brownish, dusky, grayish and whitish in mixture; throat and middle of breast white.

Habitat.—Eastern North America, west to the Mississippi Valley, and from Labrador south to Costa Rica.

This well-known and rather common inhabitant of the forests can easily be recognized by its large size, the conspicuous white feathers of the throat and the long-ear tufts which measure 2½ inches or more in length. The Great Horned, the largest of all our native owls, is the first to commence nesting. I have found its eggs in February, and am told that it occasionally lays in January. In this locality the Great Horned Owl seldom breeds in hollow trees; sometimes it constructs a rude and bulky nest of sticks, lined with grasses and feathers, on the large horizontal limbs of trees in its favorite wooded retreats. Its eggs, measuring about 2¼ inches in length by 2 inches in width, are mostly deposited in the deserted nests of hawks or crows. Although it is stated by different writers that this species lays four or more eggs, I have never found, in seven nests examined, over two eggs or a like number of young. Mr. Thomas H. Jackson, of West Chester, Pa., writing in the

* This species, and also the Great Horned Owl, is said to prey occasionally on fishes.



White-bellied Swallow.

1. Adult Male; 2. Female.

Ornithologist and Oölogist, June, 1886, says: "In thirteen nests of this bird that have come under personal notice, twelve contained two eggs, or young, and only one contained three eggs. All the nests referred to above were placed in branches of trees and were generally those of hawks or crows, renovated or enlarged. Occasionally a hollow tree is used for this purpose. Upon one occasion I replaced the owl's eggs taken from a nest with those of the common hen, and upon visiting them at the expiration of three weeks, found that both the latter had been hatched and had fallen from the nest, about twenty feet from the ground, and that the owls had deserted the locality. The Great Horned Owls are liberal providers for their young. I have frequently found full grown rabbits lying in the nest beside the young, and scarcely a nest visited did not have a strong odor of skunk, while bones and feathers were scattered around attesting to the predacious habits of the proprietors." "The flight of the Great Horned Owl is elevated, rapid and graceful. It sails with apparent ease and in large circles, in the manner of an eagle, rises and descends without the least difficulty by merely inclining its wings or its tail as it passes through the air. Now and then it glides silently close over the earth with incomparable velocity, and drops, as if shot dead, on the prey beneath. At other times, it suddenly alights on the top of a fence stake or a dead stump, shakes its feathers, arranges them, and utters a shriek so horrid that the woods around echo to its dismal sound. Now, it seems as if you heard the barking of a cur dog; again the notes are so rough and mingled together that they might be mistaken for the last gurglings of a murdered person striving in vain to call for assistance; at another time, when not more than fifty yards distant, it utters its more usual *hoo, hoo, hoo-e*, in so peculiar an undertone that a person unacquainted with the notes of this species might easily conceive them to be produced by an owl more than a mile distant. During the utterance of all these unmusical cries it moves its body, and more particularly its head, in various ways, putting them into positions, all of which appear to please it much, however grotesque they may seem to the eye of man. In the interval following each cry it snaps its bill."—*Audubon.*

These owls, like the preceding species, are not migratory and when not engaged in breeding lead a solitary existence. Although chiefly nocturnal in habits, Great Horned Owls are often seen in cloudy weather and in the early twilight searching for food. On one occasion, when the sun was shining brightly (about 10 A. M.), I saw one of these owls make two attempts to catch a hen and her young chicks.

Audubon says: Its food consists chiefly of the larger species of gallinaceous birds, half-grown wild turkeys, pheasants and domestic poultry of all kinds, together with several species of ducks. Hares, young opossums and squirrels are equally agreeable to it, and whenever chance throws a dead fish on the shore the Great Horned Owl feeds with peculiar avidity on it."

Nuttall tells us they usually prey on young rabbits, squirrels, rats, mice, quails and small birds of various kinds; and when these resources fail or diminish, they occasionally prowl pretty boldly around the farmyard in quest of chickens, which they seize on the roost.

My own records of sixteen examinations of Great Horned Owls, which, with one exception, were all taken during the winter months, revealed in eleven individuals only remains of poultry; two others, portions of rabbits, and of the three remaining birds of this series it was found that one had taken two mice; another showed small amount of hair, apparently that of an opossum. The sixteenth and last bird contained a mouse and parts of beetles.

GENUS **NYCTEA** STEPHENS.

Nyctea nyctea (LINN.).

Snowy Owl.

DESCRIPTION (*Plate 88*).

Length from 20 to 24 inches: extent 4¼ to 5 feet; tail between 9 and 10 inches long; tarsi and toes densely covered with long hair-like feathers; black bill almost hidden by long feathers; plumage white, with brownish or blackish spots and bars; throat, face, feet and middle of breast whitest. The female is largest and much darker than male; eyes rather small and yellow; no ear tufts.

Habitat.—Northern portions of the Northern Hemisphere. In North America, breeding mostly north of the United States; in winter migrating south to the middle states, straggling to South Carolina, Texas and the Bermudas.

The Snowy Owl rendered so conspicuous by its large size and white plumage is a native of the Arctic regions. This owl is found in Pennsylvania only as a winter visitant. Although specimens are taken nearly every winter, this species is most frequently observed during excessively severe winters. Usually solitary birds are observed, but sometimes parties of six, eight or even a dozen are seen together.

Wilson says: "Unlike most of his tribe he hunts by day as well as by twilight, and is particularly fond of frequenting the shores and banks of shallow rivers, over the surface of which he slowly sails, or sits on a rock a little raised above the water watching for fish. These he seizes with a sudden and instantaneous stroke of the foot, seldom missing his aim." Nuttall writes: "He ventures abroad boldly at all seasons, and like the hawks, seeks his prey by daylight as well as dark, skimming aloft and reconnoitring his prey, which is commonly the White Grouse, or some other birds of the same genus, as well as hares. On these he darts from above, and rapidly seizes them in his resistless talons. At times he watches for fish, and condescends also to prey upon rats, mice and even carrion."

NO.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	Winter, 1879.	Chester county, Pa., ...	Rabbit.
2	Winter, 1879.	Chester county, Pa..	Meat, apparently beef.
3	December 16, 1885.	Delaware county, Pa.,.	Common rat.

GENUS **SURNIA** DUMÉRIL.

Surnia ulula caparoch (MÜLL.).

American Hawk Owl.

DESCRIPTION.

"General form rather long but robust; size medium; head moderate, without ear tufts; facial disc obsolete; legs rather short and densely feathered to toes; wings rather long; first, four quills incised on inner webs; tail long with its central feathers about two inches longer than the outer. Upper parts fuliginous brown, with numerous partially concealed circular spots on the neck behind scapulars and wing-coverts. Face grayish-white; throat white with longitudinal stripes of dark brown; a large brown spot on each side of breast; other under parts with transverse lines or stripes of pale ashy-brown; quills and tail brown, with bands of white; bill pale yellowish; iris yellow. Color of upper parts darker on head, and the white markings more or less numerous in different specimens." (Length 15 to 17½ inches; extent about 33; tail 7 or little less.)—*B. B. of N. A.*

Habitat.—Arctic America, migrating in winter to the northern border of the United States. Occasional in England.

This curious bird partakes of the general appearance, and also the habits, of both a hawk and an owl, and is said to be principally diurnal.

Very rare and irregular winter visitor from the north. Joseph Krider has a specimen captured some few years ago, near Philadelphia, in mid-winter.

Messrs. R. C. Wrenshall, Allegheny county, J. F. Kitcham, Bradford county, and J. G. Bohn, report the capture of stragglers.

ORDER COCCYGES. CUCKOOS.

SUBORDER CUCULI. CUCKOOS.

FAMILY **CUCULIDÆ**. CUCKOOS, ANIS.

THE CUCKOOS.

Two species of this family are found in Pennsylvania as summer residents. These, the Black and Yellow-billed Cuckoos, can be recognized by the following characters: Bill curved, black or yellow, and about as long as head. Tail, often graduated, with spotted and long feathers; loral feathers soft; four toes arranged in pairs, the outer versatile and directed somewhat laterally; feet are weak; chiefly arboreal in habits. A specimen of the Ani (*Crotophaga ani*, Linn.), a species which inhabits the West Indies and eastern South America, was taken near Philadelphia, September, 1849.

SUBFAMILY **COCCYGINÆ**. AMERICAN CUCKOOS.

GENUS **COCCYZUS** VIEILLOT.

Coccyzus americanus (LINN.).

Yellow-billed Cuckoo; Rain Crow; Kow-bird.

DESCRIPTION (*Plate 89*).

Length about 12 inches; extent about 15½; tail about 6½; upper mandible, except edges, which are yellow like the lower, and tip of latter yellow. Above grayish-olive with metallic reflections; below white; middle tail feathers longest and like back, rest black with white tips, each spot being about one inch long; iris brown; naked legs bluish.

Habitat.—Temperate North America, from New Brunswick, Canada, Minnesota, Nevada and Oregon south to Costa Rica and the West Indies. Less common from the eastern border of the plains westward.

This species is easily known by the yellow under mandible, the broadly white-tipped tail feathers and the bright cinnamon markings of the wings. The Yellow-billed Cuckoo, a common summer resident, arrives in Pennsylvania about the last week in April, and returns generally to its southern winter resorts by the latter part of September. The common names of Rain Crow and Kow-bird given to both the Yellow and Black-billed Cuckoos arise from their peculiar and loud gutteral notes of *Kow, Kow*, which are, it is said, most clamorous at the approach of rain. Both species are also known in some sections of this state by the name of Indian Hen. The cuckoos are much more frequently heard than seen, unless it is at times when they dart from one tree to another, or into the thick foliage of bushes. The nest of this species is loosely built of small sticks lined with grasses, and placed usually on the low limb of a tree; sometimes, however, it is found in thick bushes. The eggs, generally two or four, are light greenish-blue in color and measure about 1.24 inches in length, and about .90 of an inch in width. Writing of this species Audubon says: "It robs smaller birds of their eggs, which it sucks on all occasions, and is cowardly and shy, without being vigilant. On this latter account it often falls a prey to several species of hawks, of which the Pigeon Hawk may be considered as its most dangerous enemy. It prefers the southern states for its residence, and when very mild winters occur in Louisiana, some individuals remain there, not finding it necessary to go farther south. They feed on insects, such as caterpillars and butterflies, as well as on berries of many kinds, evincing a special predilection for the mulberry. In autumn they eat many grapes. They now and then descend to the ground to pick up a wood-snail or a beetle."

According to Wilson the diet of this species consists for the most part of caterpillars, particularly such as infest apple trees. They also eat various kinds of berries, but from the circumstances of destroying such

numbers of very noxious larvæ, they prove themselves the friends of the farmer and are highly deserving of his protection.

In the stomachs of nine of these birds I found the following food materials:

No.	Date.	Locality.	Food-Materials.
1	July 15, 1879.	West Bradford, Pa..	Grasshoppers and snails (*helix*).
2	July 15, 1879.	Pocopson, Pa..	Beetles (on apple tree).
3	June 5, 1880.	Chester county, Pa.. . . .	Caterpillars (feeding in apple orchard).
4	June 5, 1880.	Chester county, Pa.. . . .	Caterpillars and fragments of beetles.
5	June 5, 1880.	Chester county, Pa.. . . .	Caterpillars.
6	May 26, 1883.	West Chester, Pa..	Beetles.
7	June 1, 1883.	Pocapson, Pa..	Stomach gorged with insects, chiefly caterpillars (feeding in locust trees).
8	June 1, 1883.	Pocopson, Pa..	Many caterpillars and fragments of beetles (feeding in locust trees).
9	July 28, 1883.	Chester county, Pa.. . . .	Berries.

Coccyzus erythrophthalmus (Wils.).

Black-billed Cuckoo; Rain Crow; Kow-bird.

Description (*Plate 89*).

Size about same as Yellow-billed species; bill entirely black (bluish-black about base of lower mandible). Above bronzy grayish-brown, with greenish tint; below white tinged with grayish and traces of yellowish especially on fore-parts; naked *eyelids* bright *red*. Tail feathers with *very small* white tips; eyes brown; legs pale bluish lead color.

Habitat.—Eastern North America, from Labrador and Manitoba south to the West Indies and the valley of the Amazon; west to the Rocky mountains. Accidental in the British Islands and Italy.

This species is found in Pennsylvania only as a summer resident. It arrives generally a few days after the Yellow-billed has made its appearance, and returns to its southern winter resorts about two weeks, Audubon says, earlier than the Yellow-billed Cuckoo.

In February, 1885, I saw several of these birds in the Florida orange orchards. The nest, a frail structure of twigs, bark, and in some instances blossoms of different plants, is placed on a low tree or bush. The eggs, usually two or four, are mostly a trifle smaller and darker in color than those of the Yellow-billed Cuckoo. Both species, according to my observation, always build their own nests, and never, like the Cow Bunting, deposit their eggs in the nests of other birds. The Rain Crows are extremely cowardly, and if attacked by any of their feathered neighbors, whose nests they sometimes pillage, they immediately fly off and conceal themselves in the dusky retreats of a tree or bush. In relation to this bird, Audubon says: "The flight of this species is swifter than that of its near relative, the Yellow-billed Cuckoo, for which bird it is easily mistaken by ordinary observers. It does not so much frequent the interior of woods, but appears along their margins, on the edges of creeks and damp places. The most remarkable distinction, however, between this species and the Yellow-billed Cuckoo is, that the former, instead of

feeding principally on insects and fruits, procures fresh-water shell-fish and aquatic larvæ for its sustenance. It is, therefore, more frequently seen on the ground, near the edges of the water, or descending along the drooping branches of trees to their extremities, to seize the insects in the water beneath them." In the adult plumage the Yellow-billed and the Black-billed Cuckoos, when flying, can be distinguished, if you bear in mind that in the former the long tail feathers, with large white tips, are very conspicuous; on the other hand, the white tips on the tail feathers of the Black-billed are not well marked. This bird, as well as the Yellow-billed Cuckoo, I have observed, subsists largely on the tent caterpillars, which are so numerous at times on our various fruit and shade trees. It also feeds on beetles, grasshoppers, snails and earth-worms.

SUBORDER ALCYONES. KINGFISHERS.

FAMILY ALCEDINIDÆ. KINGFISHERS.

GENUS CERYLE BOIE.

Ceryle alcyon (LINN.).

Belted Kingfisher.

DESCRIPTION (*Plate 20*).

Length about 13 inches; extent of wings about 22 inches.

Bill long, straight and sharp; legs small; outer and middle toes united to their middle; head has long crest; plumage of upper parts, dull leaden blue, more or less streaked with black; feathers of sides, wings, and broad band across breast, dull blue like back; spot in front of eye, white; tail with transverse bands and white spots. Female similar but barred across belly, and feathers on sides reddish-brown.

Habitat.—North America, south to Panama and the West Indies.

Kingfishers are common along our rivers, streams and ponds, about which they are found at all seasons, unless forced to migrate southward by excessively cold weather. The loud and harsh cry of this bird, as Wilson has properly stated, is not unlike the noise made by twirling a watchman's rattle. "It is uttered while moving from place to place, always on being disturbed, and even sometimes when he is about to plunge into the water for a fish. But especially it is heard at night when the male bird is returning to the nest with food for his mate and young."—*Gentry.* Their eggs are deposited in holes which they excavate in the sides of banks, usually about the streams and ponds they frequent. On many occasions, I have discovered their nests in high embankments along public roads, railroad cuts and old quarries. The excavations vary greatly in depth, but average about four or five feet; occasionally you find one straight, commonly, however, they are directed to the right or left of the main opening and terminate in quite a large cavity. The eggs (1.30 by 1.06 inches) are white and usually six in num-

Cedar Bird, or Cedar Wax-wing.

1. Male; 2. Female.

ber, although I have in several instances seen seven. The eggs, according to my observation, are invariably deposited on the bare earth. Mr. Gentry, however, tell us that he has "in many instances known them to be deposited in a warm and cosy nest constructed of dried grasses and feathers." Kingfishers feed almost entirely on fish. Their proficiency in catching small fish is such that they are in bad repute among the owners and proprietors of trout and carp ponds. Two gentlemen of my acquaintance were so greatly annoyed by the loss of gold-fish and trout, which had been sustained from the regular visits of several pairs of these birds, that they adopted the following means for their destruction: Stakes were driven down about the ponds in several places; the tops of the stakes were sufficiently large to support steel-traps, which were set, but not baited. The birds on visiting the ponds would invariably fly to one of the stakes and alight. In less than one week ten or twelve kingfishers were in this way trapped and killed. A friend of mine, some few years ago, informed me that he caught one of these birds on a hook and line, while fishing in the Brandywine, near Chadd's Ford. My informant said he had a live bait (minnow) on his hook, and as he was winding up his line on the reel, he saw a kingfisher plunge into the water at his bait, which it not only caught, but at the same time hooked and entangled itself so that it could not escape. One day B. M. Everhart found a kingfisher lying on the bank of a small stream. On making an investigation, Mr. Everhart ascertained that the bird was unable to fly, as its bill was tightly clasped in the grasp of a large fresh-water mussel. I have heard of two or three instances where kingfishers have been captured under similar circumstances, which would naturally lead one to suppose that they feed to a limited degree on the flesh of these bivalves.

According to certain writers, this species is said to feed occasionally, though rarely, on insects. Mr. E. A. Samuels states that he once shot a kingfisher which had just seized a mouse (*Arvicola*).

The stomach contents of fourteen kingfishers examined by myself are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	Feb. 3, 1879.	Chester county, Pa.	Remains of fish.
2	Feb. 26, 1879.	Newark, Del.	Remains of fish.
3	June 11, 1880.	Chester county, Pa.	Remains of fish.
4	Aug. 20, 1880.	Chester county, Pa.	Remains of fish.
5	Mar. 3, 1881.	Chester county, Pa.	Remains of fish.
6	Apr. 26, 1881.	Chester county, Pa.	Remains of fish.
7	Sept. 11, 1881.	Chester county, Pa.	Remains of fish.
8	Nov. 28, 1882.	Chester county, Pa.	Remains of fish.
9	Apr. 20, 1882.	Chester county, Pa.	Remains of fish.
10	May 30, 1882.	Chester county, Pa.	Remains of fish.
11	Aug. 27, 1883.	Delaware county, Pa.	Remains of fish.
12	Apr. 1, 1884.	Chester county, Pa.	Remains of fish.
13	July 20, 1885.	Chester county, Pa.	Remains of fish.
14	Dec. 3, 1889.	Dauphin county, Pa.	Fish scales and bones

ORDER PICI. WOODPECKERS, ETC.

FAMILY **PICIDÆ**. WOODPECKERS.

THE WOODPECKERS.

Of this family there are, Dr. Coues states, nearly two hundred and fifty well determined species of all parts of the world, except Madagascar, Australia and Polynesia. In all parts of the United States, about two dozen species, and many varieties ("races") are given by different writers. I have found in Pennsylvania only seven species of the Woodpeckers, viz: The Hairy, Downy, Yellow-bellied, Pileated, Red-headed, Red-bellied and the Flicker. The Red-cockaded Woodpecker if now found here, occurs only as a straggler, and the Arctic Three-toed Woodpecker (*Picoides arcticus*) has not been observed in Pennsylvania, so far as I can learn, for many years, probably not since Audubon met with it in the forests of the Pocono mountains, Monroe county. I can get no positive evidence that the American Three-toed Woodpecker (*Picoides americanus*, Brehm.) has been captured here, although a straggler is said to have been taken, some years ago (winter), in the mountains. The Pileated, Hairy and Downy are resident, being found in nearly all parts of the commonwealth. The Pileated, of course, is rare or not found at all, in thickly settled districts or sparsely wooded regions. The Red-headed and Flicker are common breeders and in many parts of the state, especially southward, they are resident; but never as abundant in winter as in the summer season. The Red-bellied and Yellow-bellied are found with us, chiefly, during migrations; and they breed in some localities. Lumbermen and hunters in the mountainous regions know the Pileated Woodpecker as "Woodcock" or "Big-wood Picker." The Hairy and Downy Woodpeckers are improperly termed, almost universally, by farmers, fruit-growers and sportsmen, "Sapsuckers." The Redhead is usually particularized by his proper vernacular name, and the Flicker is called by many High-holder and Golden-wing. The other species, occurring here, do not appear to be designated by any particular names by the casual observer. Although woodpeckers make no efforts to build nests as other birds generally do, they nevertheless prepare with great care and labor equally suitable receptacles for their eggs and young. Woodpeckers lay their eggs,* which are white, and usually number from four to six, on chips and bits of rotten wood in cavities which they excavate with their powerful and chisel-like or wedge-shaped bills, in the dead limbs or trunks of trees. These holes or nesting places—oftentimes dug to a considerable depth—at the mouth are often just sufficiently large to permit the birds to readily pass in and out; from the entrance downward the diameter of these wooden burrows increase in size. The tongue of all our woodpeckers, with one exception, viz: the Yellow-bellied, is capable of being protruded beyond the point of the bill to a considerable extent. The *cornua* or horns of the tongue extending backward, curl up over the back of the skull; these horns are enveloped in muscles by the action of which the tongue is thrust out. This singular arrangement can easily be demonstrated by simply taking hold of the end of the tongue of a Flicker we will say, and as you move it backward and forward place a finger on the top of the bird's head, and at once a peculiar, worm-like movement will be discovered as the horns run back and forth between the skin and bony covering of the head, beneath your finger. The end of the tongue in woodpeckers, other than the species above mentioned, is generally furnished on either side with little barbs, very similar in appearance to those found on small fish-hooks. In the Yellow-bellied Woodpecker the horns of the *hyoid* bone extend only

* The following measurements will show about the average size of species which breed in this State: Hairy Woodpecker, about 1 inch long and a little less than ¼ wide. Downy Woodpecker, about .80 of an inch long by about .65 wide. Pileated Woodpecker about 1.25 of an inch long by 1 inch wide. Red-headed Woodpecker, a little over 1 inch long and about .85 of an inch in width. Flicker, about 1.10 long and .90 wide. Red-bellied about 1.00 long by about .80 wide. Yellow-bellied .90 long by .68 wide.

to the base of the skull, hence the tongue is capable of but little extensibility; in place of the barbs commonly seen, we find the end quite abundantly provided with "numerous bushy filaments." The peculiar structure of their feet and sharp nails enable them by the additional support of the rigid tail, to ascend the trunks and limbs of trees with singular address and celerity, either in straight or spiral lines. From "Coues' Key to North American Birds"—a most valuable work and one which deserves a place in the library of all who desire to thoroughly acquaint themselves with our feathered fauna—the following extract relative to these birds is taken: "Species are abundant in all the wooded portion of this country and wherever found are nearly resident. For, although insectivorous, they feed principally upon dormant or at least stationary insects, and therefore need not migrate; they are, moreover, hardy birds. They dig insects and their larvæ out of trees, and are eminently beneficial to the agriculturist and fruit-grower. Contrary to prevalent impression, their boring does not seem to injure fruit trees, which may be riddled with holes without harmful results. The number of noxious insects these birds destroy is simply incalculable; what little fruit some of them steal is not to be mentioned in the same connection, and they deserve the good will of all. The birds of the genus *Sphyrapicus* are probably an exception to most of these statements. But woodpeckers also feed largely upon nuts, berries and other fruits; and those which thus vary their fare to the greatest extent are apt to be more or less migratory, like the common Red-head for example. Woodpeckers rarely, if ever, climb head downward, like Nuthatches, nor are the tarsi applied to their support."

The notes of these birds, uttered when on the wing, likewise when at rest, are loud and unmusical. Woodpeckers, with the exception of the Flicker, are not usually observed to alight on the ground. Insects which lie under the bark are readily discovered by the woodpecker, who gives a sharp tap with his bill, and then placing his head close to the tree, listens attentively to hear the movements of his favorite prey. As soon as he discovers a beetle or a grub moving in its snug retreat the bark or other covering of the luckless insect is torn away and the crawling creature is captured.

The large chisel-like bill, the stiff tail-feathers, which gradually taper to a point, the two toes in front and two behind (birds of the genus *Picoides* have hallux or first toe absent) will suffice to enable you to recognize a woodpecker. Tail-feathers 12 in number, the outer pair very small and hidden by the larger.

GENUS **DRYOBATES** BOIE.

Dryobates villosus (LINN.).

Hairy Woodpecker; Sapsucker.

DESCRIPTION (*Plate 76*).

Length about 9¼ inches; extent about 15; male has hind head red; female has no red. Top of head, sides of same, and back black, the latter with a long whitish stripe; quills and wing-coverts with numerous white spots; four middle tail feathers black, next partly black, and four outer feathers white; below white; young duller and top of head, especially in front, reddish or bronzy.

Habitat.—Middle portion of the eastern United States, from the Atlantic coast to the great plains.

The Hairy Woodpecker is found in Pennsylvania at all seasons of the year. It is quite plentiful, but in many sections, and probably throughout the state, is less abundant than the Downy Woodpecker. The Hairy Woodpeckers, generally shy and somewhat difficult to approach, are found mostly in the woods, and although they sometimes when in

quest of food visit the trees in orchards and yards, their visits to these places are much less frequent than those of the little Downy.

Both the Hairy and Downy Woodpeckers are called "Sapsuckers" by those who are unacquainted with birds, from the common belief that both subsist largely on the sap of apple and other fruit trees. This popular, yet mistaken idea, has induced many farmers and fruit-growers to destroy these two species, as well as other woodpeckers, when found about their orchards.

Wilson refers to this bird as "a haunter of orchards and lover of apple trees, an eager hunter of insects, their eggs and larvæ in old stumps and old rails, in rotten branches and crevices of the bark." "The food of this species consists principally of the eggs and larvæ of injurious insects that are burrowing in the wood of our fruit and forest trees; these he is enabled to obtain by chiseling out a small hole with his powerful bill, and drawing them from their lurking places with his long barbed tongue. He also eats some small fruits and berries, but never, so far as I am aware, the buds or blossoms of trees, as some persons assert."—*E. A. Samuels.*

The food materials of nine of these woodpeckers examined by me are mentioned below:

No.	Date.	Locality.	Food-Materials.
1	Nov. —, 1879,	Chester county, Pa.,	Seeds of berries.
2	April 11, 1880,	Newark, Delaware.	Larvæ and beetles.
3	June 13, 1880,	Chester county, Pa.,	Spiders and dipterous insects.
4	Dec. 20, 1880,	Chester county, Pa.,	Small seeds and particles of Indian corn.
5	Jan. 28, 1881,	Chester county, Pa.,	Beetles.
6	Mar. 10, 1881,	Chester county, Pa.,	Numerous insects.
7	Sept. 13, 1881,	Chester county Pa.,	Black ants and larvæ.
8	May 18, 1883,	Chester county, Pa.,	Black ants, diptera and beetles
9	Mar. 26, 1884,	Chester county, Pa.,	Beetles and larvæ.

Dryobates pubescens (Linn).

Downy Woodpecker; Sapsucker.

Description (*Plate 76*).

Length about 6½ inches; extent about 11½; outer tail feathers barred with black and white, otherwise same in color as *D. villosus.*

Habitat.—Northern and eastern North America, from British Columbia and the eastern edge of the plains northward and eastward.

This indefatigable little insect hunter, the smallest of all our woodpeckers, is a common resident in Pennsylvania. The timid disposition so frequently noticed in the preceding species is rarely, if ever, shown by the Downy Woodpeckers, which, at all seasons, are found frequenting our shade and fruit trees, and not unfrequently these little feathered carpenters may be observed excavating nesting places in trees close to the habitations of man. Downy Woodpeckers subsist chiefly on various forms of insects, and when this food becomes scarce they feed oftentimes on the seeds of grasses and some few other plants; also, small

Red-eyed Vireo.
Male.

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fruits, such as wild grapes, cedar berries, etc. In the winter months I have seen these woodpeckers, also Tufted Titmice and White-bellied Nuthatches, feed with apparent relish on pieces of fat beef and pork, which had been suspended in trees or nailed to grape-arbors for their benefit. The kernels of walnuts, shell-barks and other nuts that I have placed in trees were likewise eaten by both the woodpecker and nuthatch.

The stomach contents of ten Downy Woodpeckers taken in Pennsylvania, and examined by the author and Mr. Benjamin M. Everhart, of West Chester, are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	Feb. 20, 1880,	East Bradford, Pa.,	Larvæ.
2	Feb. 20, 1880,	East Bradford, Pa.,	Beetles and other insects.
3	Mar. 6, 1880,	East Bradford, Pa.,	Larvæ, beetles and seeds of *Rosa lucida*.
4	May 1, 1880,	Willlstown, Pa.,	Larvæ.
5	Sept. 25, 1880,	East Bradford, Pa.,	Berries and "grub worms."
6	Sept. 24, 1880,	East Bradford, Pa.,	"Wood grubs."
7	Nov. 20, 1884,	East Bradford, Pa.,	Small seeds and fragments of beetles.
8	Nov. 20, 1884,	East Bradford, Pa.,	Larvæ and fragments of beetles.
9	Dec. 20, 1884,	West Chester, Pa.,	Insects, chiefly beetles.
10	May 23, 1885,	Chester county, Pa.,	Larvæ.

Dryobates borealis (Vieill.).

Red-cockaded Woodpecker.

Description.

Length 7½ to 8¼ inches; extent about 14; male has narrow red streak, mostly concealed by black feathers above, on each side of occiput and above the silky-white spaces that extend from under and back of eyes; feathers on sides of lower mandible, those about nostrils, chin, throat, middle of breast and central part of abdomen, also feathers about eye, (except in front) sides of head and neck, white, purest about head. A black streak, connecting with black lores, runs backward under the showy white cheek patch; top of head, neck behind and two central tail feathers, black; other feathers in middle part of tail, black, with white bars, and the outer tail feathers are white, barred especially on inner webs with black; back barred with black and white; wings brownish, barred with white; iris brown; bill and legs (dried skin) blackish. The female has no red stripes on head.

Habitat.—Southeastern United States, from New Jersey (at least formerly), Tennessee, and Indian Territory south to eastern Texas and the Gulf coast.

The Red-cockaded Woodpecker, abundant in the open pine woods of Florida, where it is called "Sapsucker" by some, and by others "Pine-bark Woodpecker," I have never observed in this state. Reports—seventy odd in number—which have been sent to me by naturalists and collectors of all parts of the state, fail to show that it occurs anywhere in our commonwealth. Dr. Ezra Michener, in his catalogue of *Chester County Birds*, published in 1863, writes: "Red-cockaded Woodpecker accidental; very rare." Thos. G. Gentry (*Life Histories of Birds*), referring to this species says: "That it is a rare visitant in eastern Pennsylvania cannot be doubted, as an individual was taken a few years since, and is now deposited with the writer. This specimen was shot in Delaware county, just beyond the southern border of Philadelphia."

Genus **SPHYRAPICUS** Baird.

Sphyrapicus varius (Linn.).

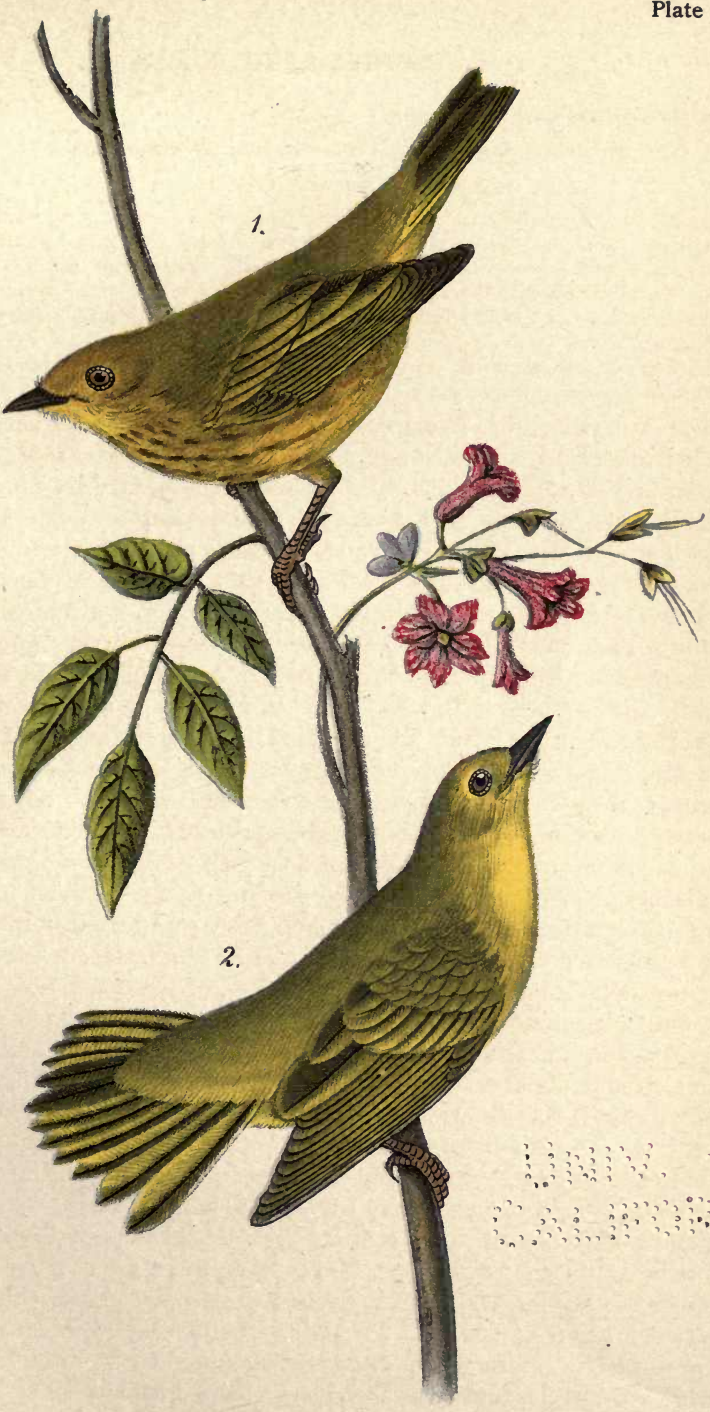
Yellow-bellied Sapsucker; Yellow-bellied Woodpecker.

Description (*Plate 77*).

Length about 8½ inches; extent about 15; male, crown, chin and throat bright red; female has chin and throat white, and crown mostly red, but sometimes black; breast, both sexes black, and belly yellow; this latter color brightest in young birds. Upper parts varied with black, yellowish and white; broad white stripe on edge of wing-coverts. Tail feathers mostly black, except inner webs of middle pair, which are mainly white.

Habitat.—North America, north and east of the great plains, south to the West Indies, Mexico and Guatemala.

The Yellow-bellied Woodpecker breeds from the northern United States northward, and although found breeding in this state (in mountainous and elevated regions) it is classed with our rare breeders. Occasionally a few of these birds are found here in winter. Generally speaking, however, the Yellow-bellied Woodpeckers are to be observed as somewhat common spring and fall migrants, which arrive in this region early in April, and soon disappear to return again, but not earlier than the last week in September. During their visits in the spring these birds are much less abundant than in the autumn, and are seen principally in the woods, although I have, in many instances, observed them in apple orchards. While they sojourn with us in the fall, they evince a strong disposition to frequent apple trees; often as many as six or eight of these birds can be secured in a small orchard. All woodpeckers have a common habit of hiding behind limbs, or sometimes in holes, etc., as you approach a tree on which they are feeding, and usually they continually shift their positions to escape notice. When hunting in apple orchards, particularly in the fall, I have repeatedly seen the Yellow-bellied Woodpecker slip behind a limb, and remain perfectly motionless, as if he understood that the color of his back, not unlike the general appearance of the bark or lichens, against which he rested, might aid him in eluding observation. Oftentimes I have made two or three circuits about trees where these birds were thus hiding, and generally noticed that they would not move until convinced by my actions that they had been discovered. Of all our woodpeckers, the subject of this present sketch, is probably the most expert in capturing insects on the wing; this bird, oftentimes, like the Common Pewee or other flycatchers, may be seen to start from a limb and seize its passing prey. This bird, like the Hairy and Downy Woodpeckers, is frequently seen clinging to the small twigs of various trees and bushes collecting insects or picking at berries. The Yellow-bellied Woodpecker is the only representative of the genus *Sphyrapicus* found east of the Mississippi river; two species and one sub-species of this genus occur in the Rocky mountain and Pacific coast regions of the United States.



Yellow Warbler.

1. Male; 2. Female.

List of counties, with names of observers, in which *S. varius* has been found breeding or during migrations.

COUNTY.	OBSERVERS.	REMARKS.
Bradford.	J. L. Camp.	Common migrant: probably breeds.
Do.	A. J. Lilley.	Rare breeder; common migrant.
Bucks.	B. H. Warren.	Migrant; common in fall.
Berks.	D. F. Keller.	Migrant.
Cumberland.	T. L. Neff.	Breeds.
Chester.	B. H. Warren.	Migrant; very abundant in fall; occasional winter resident.
Crawford.	H. C. Kirkpatrick.	Breeds.
Clinton.	Dr. W. Van Fleet.	Migrant.
Clearfield.	Dr. Van Fleet.	Migrant.
Cameron.	M. M. Larrabee.	Migrant; most abundant in fall.
Columbia.	Dr. MacCrea.	Migrant.
Delaware.	B. H. Warren.	Migrant; abundant in fall and occasionally seen in winter.
Erie.	Geo. B. Sennett.	Common migrant; think it breeds occasionally.
Lackawanna.	Geo. P. Friant.	Migrant.*
Do.	James F. Green.	Migrant; probably breeds.
Do.	H. W. Williams.	Migrant; sometimes seen in summer.
Do.	M. J. Webster.	Migrant.
Lehigh.	J. F. Kocher.	Migrant.
Lancaster.	Dr. A. C. Treichler.	Migrant.
Do.	W. H. Buller.	Migrant.
Lycoming.	August Kock.	Migrant.†
McKean.	J. A. Teulon.	Formerly common breeder; now quite rare as native.
Northampton.	Dr. J. W. Detwiller.	Migrant.
Northumberland.	Dr. W. Van Fleet.	Migrant.
Philadelphia.	Rev. Jos. Johnson.	Migrant.
Do.	Jos. Price Ball.	Migrant; common in fall.
Do.	H. Jamison.	Migrant.
Somerset.	H. D. Moore, M. D.	Migrant.
Sullivan.	Otto Behr.	Breeds.
Union.	Dr. W. Van Fleet.	Migrant.
Venango.	J. H. Robertson.	Migrant.
Warren.	H. L. Greenlund.	Breeds sparingly and irregularly
Wayne.	N. F. Underwood.	Migrant.
Westmoreland.	Chas. H. Townsend.	Apparently not common.
Washington.	M. Compton.	Migrant.
Do.	W. T. Warrick.	Migrant.
Do.	Jas. S. Nease.	Migrant.
York.	Geo. Miller.	Migrant.
Do.	Casper Loucks.	Migrant.
Do.	Gerard C. Brown.	Migrant.

Gentry says: "The food of these birds is less of an insect character than that of any other of the *Picarian* family. Although a great destroyer of insects in their most destructive stages, yet the untold mischief which they achieve in the perforation of the inner bark of many trees to such an extent as to kill them, fairly outbalances the immense good which they accomplish. In some parts of Wisconsin, this destruction is perpetrated on a grand scale. In 1868, Dr. Brewer, in company with Dr. Hoy, visited Racine, and witnessed the results of this perforatory process. The punctures were made into the inner bark of trees, and were so close together that the bark eventually became stripped off, causing a complete and fatal destruction of them. In one garden, all the mountain-ash and white pine trees were entirely killed."

In referring to these sap-sucking woodpeckers, Dr. Coues says: "Birds of this remarkable genus feed much upon fruits, as well as insects, and also upon soft inner bark (cambium); they injure fruit trees by stripping off the bark, sometimes in large areas, instead of simply boring holes. Of the several species commonly called 'Sapsuckers,'

* Yellow-bellied Sapsuckers have been very common the last two seasons ('88, '89) in the spring. The city (Scranton) was full of them; some killed themselves by flying against windows.—*Geo. P. Friant*

† *S. varius* arrives early in spring, is then quite plenty; disappears soon, however. Know of one instance where it bred. This bird rarely visits our orchards, therefore cannot do much damage to anything.—*August Kock.*

they alone deserve the name. In declaring war against woodpeckers, the agriculturist will do well to discriminate between this somewhat injurious and the highly beneficial species." My field observations, also the *post mortem* examinations of some twenty odd Yellow-bellied Woodpeckers (taken chiefly during the fall migrations), lead me to think that, in this region, these birds subsist mainly on insects, such as beetles, large flies, ants, spiders and larvæ. In the viscera of specimens taken in the late autumn and winter, I have found sometimes small seeds and berries. In the stomachs of two birds which were shot in apple trees, I detected a small amount of a vegetable substance, which may have been inner bark. On one occasion I opened the stomach of an adult male, taken in the spring, and noticed that it contained a considerable quantity of fluid, of a yellowish color; a drop of this fluid touched to my tongue was found to be exceedingly sweet.

Genus CEOPHLŒUS Cabanis.

Ceophlœus pileatus (Linn.).

Pileated Woodpecker.

Description (*Plate 70*).

Bill blue-black, lower mandible much lighter in color than the upper; feet and tarsi in dried specimens black; iris yellowish; general color of body, wings and tail dull black; a narrow white streak from just above the eye to occiput, a wider one from the nostril feathers (inclusive) under the eye, and along the side of the head and neck; side of the breast (concealed by the wing), axillaries, and under wing-coverts, and concealed bases of all the quills, with chin and beneath the head, white, tinged with sulphur-yellow; entire crown, from the base of the bill to a well-developed occipital crest, as also a patch on the ramus of the lower jaw, scarlet-red; a few white crescents on the sides of the body and on the abdomen. Female similar to male, but without red on the cheek and only the back part of crest red.

Length about 18 inches; extent about 27; wing 9½ inches.

Habitat.—Formerly whole wooded region of North America; now rare or extirpated in the more thickly settled parts of the Eastern States.

This bird, the largest of all our woodpeckers, is found in Pennsylvania at all seasons, but occurs only in the wooded districts, and even in most of these secluded localities it is not common. In April, 1885, I found a nest of the Pileated Woodpecker in Orange county, Florida, where this species is exceedingly numerous. It was made in a wild cherry tree growing near the edge of an orange grove. The excavation, about two feet, or a little less, in depth, was made in a dead limb. The entrance to the nest was not over twelve or fifteen feet from the ground. The glossy white eggs, quite small for the size of the bird, were removed when three had been deposited on a few chips at the bottom of the opening. As the mouth of the cavity had been somewhat broken when they were taken out, I supposed the birds would desert the place, but, about one week later I visited the tree and saw a Pileated Woodpecker, which I judge was the same bird that had been robbed by me,

at work in this cavity. Having heard the bird working, I approached the tree cautiously, and stood back of a neighboring tree, whose thick branches, with their abundant covering of "long moss" (*Tillandsia usneoides*), entirely concealed my person from this woodchopper's keen eye. I watched, and soon saw its large bill clasping a chip appear at the opening of the cavity, in another instant the head and neck were protruded, and after taking a quick survey of all surroundings, as if to assure herself that no enemy was a witness to her industry and vigilance, the chip was dropped down and the bird resumed her digging. After she had thus reappeared several times with pieces of wood, and always manifested the same caution before dropping the chips, I, when she again came in view, made a slight noise, but did not show myself, when immediately she dropped back into the cavity and did not again continue her labors or show herself, although I remained quiet for several minutes. As the dinner horn had sounded some time before, I deemed it more important to attend to the wants of the inner man than to continue to wait for the bird to renew her work, and picking up a piece of shell rock I threw it against the limb, when she flew out uttering a shrill cry.

These birds feed largely on beetles and their larvæ, which are so abundant in dead trees. Wild grapes, berries and acorns are also sometimes eaten.

The following list shows most of the counties in this state where the Pileated Woodpecker is frequently met with:

COUNTY.	OBSERVERS.	REMARKS.
Allegheny	Dr. T. Z. Hazzard	Rare; formerly quite plentiful.
Beaver	Dr. G. A. Scroggs	Breeds; resident.
Bedford	J. L. McGregor	Is found in some sections; resident.
Berks	D. F. Keller	Very rare
Crawford	H. C. Kirkpatrick	Seen in winter; probably breeds.
Clinton	Dr. Van Fleet	Resident.
Clearfield	Dr. Van Fleet	Resident.
Cameron	M. M. Larrabee	Resident; tolerably common.
Chester	B. H. Warren,*	Straggler; one taken about twelve years ago.
Clarion	W. Shanafelt	Resident; not common.
Columbia	Dr A. B. MacCrea	Resident.
Dauphin	W. W. Stoey	Resident.
Erie	Geo. B. Sennett	Resident; few are found about Lake Pleasant.
Fayette	B. H. Warren	Saw one in December, 1889.
Fulton	Hon. W. S. Alexander	Resident.
Luzerne	D. J. Linskill	Resident.
Lycoming	August Kock	Resident.
Lackawanna	G. P. Friant	Resident; quite common; increasing.
McKean	J. A. Teulon	Resident.
Mercer	S S. Overmoyer	Breeds.
Mifflin	B. H. Warren	Resident.
Northumberland	Dr. Van Fleet	Resident.
Perry	H. J. Roddy	Resident.
Susquehanna	S. S. Thomas	Rare.
Sullivan	Otto Behr	Resident.
Somerset	Dr. H. D. Moore	Resident.
Schuylkill	M. M. MacMillan	Resident.
Union	Dr. Van Fleet	Resident.
Venango	J. R. Robertson	Rare.
Warren	H. L. Greenlund	Rare.
Wayne	N. F. Underwood	Breeds.
Washington	James S. Nease	Resident.
Do.	M. Compton	Rare; probably breeds.
Do.	W. T. Warrick	Rare; probably breeds.
Westmoreland	Chas. H. Townsend	Occasionally seen in heavy timbered localities.

* Pileated Woodpeckers have also been seen or heard by the writer, during the past two years, in the counties of Armstrong, Blair, Cambria, Centre, Elk, Jefferson, Forest and Potter: in some parts of Centre, Elk, Forest and Potter this bird is often seen.

Genus **MELANERPES** Swainson.

Melanerpes erythrocephalus (Linn.).

Red-headed Woodpecker.

Description (*Plate 21*).

Head and neck all around crimson red, margined by a narrow crescent of black on the upper part of the breast; back, primary quills, and tail bluish-black; under parts generally, a broad band across the middle of the wing, and the rump white: belly usually tinged with reddish. Bill and feet blue-black; iris brown. Female is not different.

Young.—Head, neck and back dull gray, varied with blackish; secondary feathers, usually crossed with dark bands. The head in nearly all specimens taken in fall and winter, with more or less red feathers.

Length 9½ inches; extent about 18; wing 5½ inches.

Habitat.—United States, west to the Rocky mountains, straggling westward to Salt Lake valley; rare or local east of the Hudson river.

The Red-headed Woodpecker, readily recognized by its red, white and blue plumage, is found in Pennsylvania at all seasons, but during the summer is much more abundant than at other periods. I have repeatedly observed these birds during the autumn and winter months, in small parties numbering from eight to a dozen or sometimes twenty individuals, but never found them in large flocks.

In many localities in eastern Pennsylvania during the past few years these beautiful birds have become quite scarce. As farmers and fruit-growers very generally seem to fully appreciate the beneficent services these birds render, and seldom subject them to persecution, I attribute this scarcity largely to the fact that the adult Red-heads find a ready market for millinery purposes. When pursued by gunners, these woodpeckers first endeavor to escape by flying to the topmost branches of the tallest trees; then, if further molested, they will conceal themselves in holes, where I have known them to remain for over one hour before venturing out.

In this locality these birds subsist chiefly on an insect bill of fare; cherries, berries, occasionally ripe apples, green corn and pears are fed upon. In several examinations that I have made of birds shot in the winter season were discovered particles of acorns, gravel and different forms of insects. In the winter, like the common Crow Blackbirds, the Red-heads will sometimes visit corn-cribs and feed on corn which they pick from the ears. Although I have never seen this species store up acorns, etc., there is no doubt that they occasionally thus provide for themselves.

In the viscera of eleven Red-heads examined by the writer the following food materials were discovered:

Maryland Yellow Warbler.

1. Adult; 2. Female; 3. Young Male.

No.	Date.	Locality.	Food-Materials.
1	May 6, 1880,	Chester county, Pa.,	Beetles and sand.
2	May 17, 1880,	Chester county, Pa.,	Larvæ and seeds.
3	June 12, 1880,	Chester county, Pa.,	Cherries.
4	June 12, 1880,	Chester county, Pa.,	Cherries and ants.
5	Sept. 11, 1880,	Chester county, Pa.,	Corn (maize).
6	Sept. 11, 1880,	Chester county, Pa.,	Black ants.
7	Sept. 11, 1880,	Chester county, Pa.,	Larvæ and beetles.
8	May 8, 1883,	Chester county, Pa.,	Chiefly beetles and few dipterous insects
9	July 5, 1883,	Chester county, Pa.,	Piece of an apple.
10	Mar. 15, 1886,	Allerton Farm, Pa.,	Beetles.
11	Mar. 13, 1885,	Volusia, Florida,	Palmetto berries.

Melanerpes carolinus (Linn.).

Red-bellied Woodpecker.

Description (*Plate 76*).

Top of head and nape crimson red; forehead whitish, strongly tinged with light red, a shade of which is also seen on the cheek; still stronger on the middle of the belly. Under parts brownish white, with a faint wash of yellowish on the belly; back, rump and wing-coverts banded black and white; upper tail-coverts white, with occasional blotches; tail feathers black; first transversely banded with white; second less so; all the rest with whitish tips: inner feathers banded with white on the inner web; the outer web with a stripe of white along the middle; iris red.

Female with the crown ashy; forehead pale red; nape bright red.

Length 9¾ inches; extent about 17; wing about 5 inches.

Habitat.—Eastern United States to the Rocky mountains; rare or accidental east of the Hudson river.

Audubon found nests of Red-bellied Woodpeckers in orchards in Pennsylvania. The Messrs. Baird, writing in 1844, mention this species as occurring in the vicinity of Carlisle, Cumberland county, in reference to it they say: "Abundant; most so in winter; resident."

Dr. Ezra Michener, in his Chester county list of 1863, records this bird as a "resident, frequent; rare in summer." Dr. Turnbull, in his *Birds of Eastern Pennsylvania and New Jersey*, 1869, says, "common, but more frequent in summer; found mostly on the larger trees of the forest." Mr. Gentry, writing in 1877 (*Life Histories of Birds*), observes that he has found a few of these birds in eastern Pennsylvania from November until the latter part of April. According to my observation, the Red-bellied Woodpecker occurs in southeastern Pennsylvania only as a rare winter visitant. The few birds observed by myself in this locality were exceedingly shy, and when found were seen in tall trees in the forests. Mr. T. L. Neff, of Carlisle, has never observed it in Cumberland county, at least his report of the species found there contains no mention of it. The only locality in Pennsylvania where the Red-bellied Woodpecker has been found breeding during recent years is, so far as I can learn, in the county of Washington, along our western border. I am indebted to Mr. W. T. Warrick, of Washington, Pa., for the following interesting facts concerning the species in his locality: "This bird is not rare here, although not very abundant, and it is resident and

breeds. It is not often seen away from heavy timber, and is generally to be found in the very tops of the tallest forest trees. I have never secured any of their eggs, but my note book says that I found a pair nesting March 25, 1883, near the top of a large white-oak in edge of wood two miles from Washington. The birds were quite noisy, and while I watched them with my field glass I saw them running in and out of a nice new clean-cut hole in the live wood of the oak. The eggs were probably not laid at that date, but about the nesting there could be no doubt. I intended trying to secure the eggs, but bad weather and other circumstances prevented till the matter was overlooked. I also remember several years ago visiting a farmer friend whom I found engaged in shooting woodpeckers off a mulberry tree that stood in his yard and was full of ripe fruit. He had a dozen or more of the birds lying in a pile under the tree, and at least four or five of them were Red-bellies and the balance Red-heads. I saw and heard three of this species the last day I was in the woods (June 2). I can recognize their '*chuck*' as far as I can hear it."

The following list made up from reports—seventy odd in number—received from observers throughout the state, shows that *M. carolinus* has been observed as a breeder only in Washington county; and as a migrant it has been reported by but few persons:

COUNTY.	OBSERVERS.	REMARKS.
Bradford,	J. L. Camp,	Migrant: rare.
Clinton,	Dr. W. Van Fleet,	Migrant; rare.
Chester,	B. H. Warren,	Have taken three in ten years; all in winter.
Delaware,	B. H. Warren,	Two killed in winter.
Erie,	Geo. B. Sennett,	Winter.
*Lancaster,	Dr. A. C. Treichler,	Winter.
Lackawanna,	Geo. P. Friant,	Winter; very rare.
Luzerne,	Dr. W. L. Hartman,	Rare visitor; probably breeds.
Montgomery,	Thos. S. Gillin,	Migrant.
Northampton,	Dr. John W. Detwiller,	Migrant.
Perry,	H. J. Roddy,	Migrant.
Washington,	M. Compton,	Resident; breeds.
Do.	W. T. Warrick,	Resident; breeds.
Do.	Jas. S. Nease,	Resident; breeds.
Westmoreland,	Chas. H. Townsend,	Rather common.
York,	Gerard C. Brown,	Migrant; probably breeds occasionally.

The stomach contents of three of these birds, captured during the winter months in Chester and Delaware counties, Pa., consisted of black beetles, larvæ, fragments of acorns, and a few seeds of wild grapes.

In various sections of Florida where the Red-bellied Woodpeckers are exceedingly numerous; in fact, by odds, the most abundant of all the woodpeckers, the common names of "Orange Sapsucker" and "Orange-borer" are universally applied to them. On making inquiry of farmers and others, I learned that the names were given because these woodpeckers "sucked the sap" of orange trees and fed on oranges. Supposing these statements were wrongfully made, I, at first, gave but little attention to them. When, however, I visited Welaka, Palatka, Volusia,

* Some fifteen or twenty years ago, according to the late Judge Libhart, this species bred in Lancaster county.—*B. H. Warren.*

Deland and other places where numerous orange trees were thriving, I was informed by the orange-growers that the Red-bellied Woodpeckers oftentimes destroyed large numbers of oranges when they had matured and were ready for picking; also, that "they damaged the orange trees by boring holes in them and sucking the sap." I had but little opportunity of making a careful study of this orange-eating habit, so greatly talked about, owing to the fact that when I first visited these localities it was late in February, or after the oranges had been picked and shipped north. In the month of March, 1885, I camped a few days at "Bluffton," near Volusia, in an orange grove, owned by Mr. Bird, of New York city This grove contained about thirty acres of trees, which were loaded with fruit, then being picked for market. Through the kindness of Mr. Bird and his overseer, Mr. Curtis, I collected twenty-six Red-bellied Woodpeckers in this orange grove, eleven of these birds had fed to a more or less extent on oranges.

Three of the eleven stomachs taken from specimens killed in the forenoon, soon after daylight, contained only orange pulp. Eight stomachs showed, in addition to orange pulp, insects and berries. The stomachs of the remaining fifteen birds contained no traces of oranges, but revealed chiefly insects, a few berries and seeds. I examined two dozen or more oranges which had been attacked by the Woodpeckers, and found that all had been bored about midway between the stem and blossom end. These holes, always round, varied greatly in size. The birds usually, I think, pick off the skin from a space about the size of an ordinary five-cent piece, and then eat out the pulp. In an orchard at Hawkinsville, near Deland Landing, on the St. John's river, I oftentimes, in the month of April, 1885, found oranges which had been evidently overlooked when the crop was gathered, and in most instances observed that they were bored. In this orchard, on one occasion, I saw a Red-bellied Woodpecker eating an orange. He evidently recognized the fact that it was about the last of the season, as he had enlarged the opening sufficiently that his head was almost entirely hidden in the yellow skin, from the sides of which he picked the few remaining particles of pulp. I was shown orange trees that these "Sapsuckers" were said to have bored, these borings, however, did not appear to injure the trees, as they seemed to me to be equally as flourishing as other trees whose trunks showed no marks of a woodpecker's bill.

GENUS **COLAPTES** SWAINSON.

Colaptes auratus (LINN.).

Flicker.

DESCRIPTION (*Plate 22*).

Bill differs from other of our woodpeckers. It is long, slender, slightly curved, without lateral ridges; nostrils exposed. Shafts and under surface of wing and tail feathers gamboge-yellow; a black patch on each side of the cheek; a red crescent on the upper part of hind-neck, throat and stripe beneath the eye pale lilac-brown. A crescentic patch on the breast and rounded spots on the belly, black; back and wing-coverts with interrupted transverse bands of black; neck above and on sides ashy. In the female the black cheek patch is usually absent; eyes brown. Length about 12½ inches; extent about 20; wing about 6 inches.

Habitat.—Northern and eastern North America, west to the eastern slope of the Rocky mountains and Alaska. Occasional on the Pacific slope from California northward. Accidental in Europe.

This species, one of the most common of all our woodpeckers, is found in some sections of Pennsylvania during all months of the year; but it is far more numerous in the summer season than at other times. The Flicker, like all of the woodpeckers, flies in an undulatory manner. When flying it is easily recognized from other species by the conspicuous golden-yellow under parts of the tail and wings, and the white rump. As previously remarked, woodpeckers are not commonly seen on the ground; in this particular, however, the subject of this present sketch differs from other of his kin, as he is frequently to be observed hopping about in grass fields, meadows or along the roadside searching for food. Although the Flicker commonly lays about six eggs, I have known as many as seventeen eggs to have been taken from the nest of one bird. Flickers are great destroyers of ants; they also subsist on various forms of noxious insects, and in the fall and winter season eat, in addition to insect food, berries, wild cherries, small seeds of grasses, etc.

INSECTS THAT WOODPECKERS EAT.

In February, March and April, 1885, I collected a large number of woodpeckers at different points in Florida, in the region about the St. John's river, from Welaka to Sanford. The stomach contents of thirty-three of these birds were kindly determined for me by Prof. C. V. Riley, the eminent entomologist of the U. S. Department of Agriculture, and are given below, with a letter that came with the list:

U. S. DEPARTMENT OF AGRICULTURE,
DIVISION OF ENTOMOLOGY,
WASHINGTON, D. C., *January 28, 1886.*

B. H. WARREN, M. D., *West Chester, Pa.:*

DEAR SIR: I hand you herewith a full list of the insect material contained in the vials of birds' stomachs which you have submitted for examination. The determinations are as specific as the condition of the material would permit, and in almost every instance the generic reference is given, which is sufficient to indicate the habit of the insect.

Yours very truly,
C. V. RILEY.

RED-COCKADED WOODPECKER (*Dryobates borealis*).

Contents from eleven adults of both sexes —Six egg-cases of a small cockroach (*Ichnoptera*). The egg-cases of these small tree-inhabiting roaches are usually deposited behind the loose bark of trees. Three skins of coleopterous larvæ; judging from their last joints they belong to the genus *Tenebrio*, the larvæ of which are found under dead bark. One leg of *Pachylobious picivorus;* this snout-beetle is common throughout the south, and is found upon the different species of pines. Eight elytra of a beetle (*Cymatodera undulata* or *brunnea*). These beetles are also found under bark of living and dead trees; their larvæ live upon other insects. One small pupa of a Cerambycid insect; it is probably the pupa of a *Liopus* or *Sternidius;* both species breed in decaying twigs. One small larva of a Cerambycid insect, not recognizable. One egg of a large hemipterous insect, probably that of *Brachyrhynchus granulatus*, Say. Numerous legs of spiders and bugs. Two skins of spiders, partly digested and squeezed out. Skin of a dipterous larva. Several specimens of a dipterous pupa (*Musca*). Middle and hind leg of a Cerambycid belonging to the *Acanthocerinæ*. Large numbers of ants; the species found seem to be *Colobopsis impressa*, *Cremastogaster lineolata*, *Camponotus fallax*, *Formica fusca* and *Leptothorax curbispinosus*. Numerous legs and mouth parts, etc., referable to one or the other of the species before mentioned make up the bulk; but ants were evidently the principal food. No vegetable food was found; some vegetable fibre, and probably obtained from the palmetto, was found, however.

RED-COCKADED WOODPECKER (*Dryobates borealis*), ADULT MALE.

Contents.—Fragments of the abdomen only of *Brochymena* species; also one leg of the same. Undigested eggs of perhaps the same insect. Fragments of the abdomen of *Cremastogaster lineolatus*. Fragments of a myriapod (Julus).

RED-COCKADED WOODPECKER (*Dryobates borealis*), ADULT MALE.

Contents.—One leg of *Brochymena* species. One larva of Pyralid. One ant, head and abdominal plates, belonging to two different species. Numerous joints of a Myriapod (Julus). Parts of legs belonging to ants, hemiptera and coleoptera. The stomach was nearly empty and it was evidently a long time since the bird had made a meal.

RED-COCKADED WOODPECKER (*Dryobates borealis*), ADULT MALE.

Contents.—Numerous fragments of a *Cremastogaster*, apparently *lineolata*. One coleopterous larval skin, without head or tail; perhaps of *Tenebrio*.

PILEATED WOODPECKER (*Ceophlœus pileatus*), ADULT MALE.

Contents.—Two larvæ of *Orthosoma brunnea*. Five ants (*Camponotus esuriens*). Remains of other ants. The larva of *Orthosoma brunnea* is very destructive to pine.

PILEATED WOODPECKER (*Ceophlœus pileatus*), ADULT FEMALE.

Contents.—Two larvæ of *Orthosoma brunnea*. Numerous *Cremastogaster lineolata*. Numerous *Camponotus esuriens* and their cocoons. One larva of *Xylotrechus* spec.

PILEATED WOODPECKER (*Ceophlœus pileatus*), ADULT MALE.

Contents.—One larva of *Orthosoma brunnea*. Five ants (*Camponotus esuriens*), and fragments of the same.

PILEATED WOODPECKER (*Ceophlœus pileatus*), ADULT MALE.

Contents.—Numerous fragments of *Camponotus esuriens*. Fragments of a Cerambycid larva (*Xylotrechus?*).

PILEATED WOODPECKER (*Ceophlœus pileatus*), ADULTS, TWO MALES AND FEMALE.

Contents.—Filled with the fragments of the Palmetto-ants (*Camponotus esuriens*). One pupa of White ant (*Termes*).

RED-BELLIED WOODPECKER (*Melanerpes carolinus.*)

Contents from eight adults of both sexes. Red seeds (undigested) of two species of the Palmetto. No animal matter could be distinguished.

RED-BELLIED WOODPECKER (*Melanerpes carolinus*), ADULT MALE.

Contents.—Numerous joints of a small diplopodous myriopod, probably *Julus*. One Palmetto ant (*Camponotus esuriens*). Fragments of a tree-cricket (*Orocharis saltator.*)

RED-BELLIED WOODPECKER (*Melanerpes carolinus*), ADULT MALE.

Contents.—Berries and seeds of the Palmetto. Fragments, consisting of three legs and part of a cricket (*Nemobius*).

HAIRY WOODPECKER (*Dryobates villosus audubonii*), ADULT MALE.

Contents.—Palmetto fibers, and mixed with them traces of a Cerambycid larva. Digested fragments of a neuropterous insect, probably a small Libellulid.

HAIRY WOODPECKER (*Dryobates villosus audubonii*), ADULT MALE.

Contents.—Fragments of an elytron of *Trogosita*, a beetle common under bark. Fragments of ants. Fragments of *Julus*.

ORDER MACROCHIRES. GOATSUCKERS AND SWIFTS.

SUBORDER CAPRIMULGI. GOATSUCKERS.

FAMILY **CAPRIMULGIDÆ**. GOATSUCKERS.

THE WHIP-POOR-WILL AND NIGHTHAWK.

The name of "Goatsucker" given to members of this family originated from a silly notion that the European species sucked the teats of goats. It is misleading and should be abolished. Two species of this family are found in Pennsylvania as common summer residents. Head large, broad and flattened; eyes large; neck short; plumage, especially in Whip-poor-will, soft and owl-like; flight noiseless; bill very small; gape of great extent, reaching below eyes, and furnished with bristles. Toes four, anterior ones connected by a moveable skin; inner edge of middle claw pectinated (comb-like). Tarsi short and more or less feathered; feet small. These birds do not perch as many other birds do, but sit lengthwise of limbs, fence rails, etc., and crouch on the ground. Tail forked or rounded.

American Redstart.

1. Male; 2. Female.

GENUS **ANTROSTOMUS** GOULD.

Antrostomus vociferus (WILS.).

Whip-poor-will.

DESCRIPTION (*Plate 23*).

Length about 10 inches; extent about 18; gape with long stiff bristles reaching beyond bill; no white spot on primaries.

Habitat.—Eastern United States to the plains, south to Guatemala.

Although the Whip-poor-will and Nighthawk are generally regarded by those who are not versed in ornithology, as the same bird, it can readily be seen, by referring to Plate 23, that they differ greatly. It will be observed that the Whip-poor-will has conspicuous, long and stiff bristles at the base of bill; the bill of the Nighthawk is not furnished with long, conspicuous and stiff bristles. The Whip-poor-will has no white spot on the primaries; the Nighthawk has a well-marked spot of white on five outer primaries. The white on tail of males of both species is also different. In the Whip-poor-will the lower half of the three outer tail feathers is white; Nighthawk has a broad white bar crossing the tail (except middle feathers) near the tip. The males, both species, have transverse white throat bars. The female Whip-poor-will has a tawny throat bar, and inconspicuous terminal spots of the same color on lateral tail feathers. Female Nighthawk, throat bar tawny, white spot on wing, but no terminal patch of white crossing tail.

The Whip poor-will is a rather common summer resident in the wooded and mountainous portions of Pennsylvania. It arrives in this locality from April 22 to May 1, and migrates southward in September. The Whip-poor-will migrates singly or in pairs, and, unlike the Nighthawk, is never to be found in flocks. The Whip-poor-will is nocturnal in habits, and is seldom seen during the day unless accidentally discovered in a state of repose, when, if startled, "it rises and flies off, but only to such a distance as it considers necessary, in order to secure it from the farther intrusion of the disturber of its noon-day slumbers. Its flight is very low, light, swift, noiseless and protracted, as the bird moves over the places which it inhabits, in pursuit of the moths, beetles and other insects of which its food is composed. During the day it sleeps on the ground, the lowest branches of small trees, or the fallen trunks of trees, so abundantly dispersed through the woods. In such situations you may approach within a few feet of it; and, should you observe it whilst asleep, and not make any noise sufficient to alarm it, it will suffer you to pass quite near without taking flight, as it seems to sleep with great soundness, especially about the middle of the day. In rainy or very cloudy weather it sleeps less, and is more on the alert. Its eyes are then kept open for hours at a time, and it flies off as soon as it discovers an enemy approaching, which it can do, at such times, at

a distance of twenty or thirty yards. It always appears with its body parallel to the direction of the branch or trunk on which it sits, and, I believe, never alights *across* a branch or fence rail. No sooner has the sun disappeared beneath the horizon, than this bird bestirs itself, and sets out in pursuit of insects. It passes low over the bushes, moves to the right or left, alights on the ground to secure its prey, passes repeatedly in different directions over the same field, skims along the skirts of the woods and settles occasionally on the tops of the fence stakes or on the stumps of trees, from whence it sallies, like a Flycatcher, after insects, and on seizing them returns to the same spot. When thus situated, it frequently alights on the ground, to pick up a beetle; it also balances itself in the air, in front of the trunks of trees, or against the sides of banks, to discover ants and other small insects that may be lurking there. It is a remarkable fact that even the largest moths on which the Whip-poor-will feeds, are always swallowed tail foremost, and when swallowed, the wings and legs are found closely laid together, and as if partially glued by the saliva or gastric juice of the bird. The act of deglutition must be greatly aided by the long bristly feathers of the upper mandible, as these no doubt force the wings of the insects close together, before they enter the mouth."—*Audubon.* In several of these birds, which I have examined, were found only insects, chiefly of a lepidopterous character; once I took from the stomach of a male the remains of two or three common potato beetles. The Whip-poor-will never builds a nest. In this section it deposits its eggs about the 20th of May, on the bare ground, or on dry leaves, and occasionally, though rarely, it is said on logs, in the gloomy retreats of thickets or woods. The eggs, never more than two in number, are white or yellowish-white, irregularly spotted or blotched with brown, and bluish-gray. They measure about 1.25 inches in length and .89 of an inch in width. This bird, like the Chuck-will's-widow,* when flying about in quest of food, may be heard to utter a kind of low growling sound. This noise is the only sound I ever heard the Whip-poor-will make when on the wing.

Genus **CHORDEILES** Swainson.

Chordeiles virginianus (Gmel.).

Nighthawk.

Description (*Plate 23*).

Male, above mottled with blackish, grayish and rufous; a white V-shape mark on the throat; behind this a collar of pale rufous blotches, and another on the breast of grayish mottling; under parts banded transversely with dull-yellowish or red-

*The Chuck-will's-widow (*Antrostomus carolinensis*, Gmel.) inhabits the south Atlantic and Gulf states, "and lower Mississippi Valley, north to the Carolinas and southern Illinois." Said to winter chiefly south of United States, in Mexico, Central America, etc. April, 1885, I found this species breeding in Orange and Volusia counties, Florida, where these birds are abundant. In February and March I neither saw or heard them, and residents of Florida assured me that the "Chick-will," as the bird is there known, was found in that state only as a summer resident.

dish white and brown; wing quills quite uniformly brown; the five outer primaries with a white blotch midway between the tip and carpal joint, not extending on the outer web of the outer quill; tail with a terminal white patch.

Female without the caudal white patch, the white of the throat mixed with reddish. Length about 9½ inches; extent about 23; wing about 8 inches.

Habitat.—Northern and eastern North America, east of the Great Plains, south through tropical America to Buenos Ayres.

The Nighthawk occurs in Pennsylvania as a common summer resident. It usually arrives from its southern winter resorts, a few days after the Whip-poor-wills have made their appearance. The note of the Nighthawk is a short, sharp squeak. During the breeding season this bird has a curious habit, when flying, of falling through the air with a loud booming sound, which, as Nuttall has truly said, resembles the noise produced by blowing into the bung-hole of an empty hogshead. This peculiar booming or whirring sound, which can be heard oftentimes to the distance of a quarter of a mile or over, is produced, it is stated, by the air rushing through the stiff wing feathers. The Nighthawk never breeds in woods or thickets, but deposits her two eggs on the bare ground or rocks in open situations; the favorite breeding places are barren and rocky lands, though sometimes they have been known to deposit their eggs on roofs of buildings in large cities and towns, over which these birds all day long may be seen or heard flying in pursuit of their favorite insect prey.

The eggs, elliptical in shape and about the same size as those of the Whip-poor-will, so closely resemble the ground or pieces of rock on which they are deposited, that they are frequently overlooked by persons accustomed to search for them. The Nighthawk, like the Whip-poor-will, manifests great affection for her eggs and young, and will resort to numerous devices to induce you to follow her, when these treasurers are approached or discovered. It is stated that birds of this family have a common habit, when their eggs or young are disturbed, of removing them in their capacious mouths, to different localities. I have known the Nighthawk to move its eggs a distance of over two hundred yards, in less than one hour after I had examined them. In the breeding season especially, these birds are frequently seen sitting lengthwise on fences or on the limbs of high trees, in the vicinity of their breeding grounds. Several pairs of Nighthawks may often be found breeding within a few yards of each other. The Nighthawk, although oftentimes observed flying about during the daytime, is particularly active in the afternoon and in cloudy weather. This bird when on the wing, if not too distant, can easily be recognized by the white spot on the primaries, which is commonly spoken of as a "hole in the wing." During the latter part of August, these birds collect in large bands and leisurely proceed to winter quarters in Mexico, Central America and portions of South America, etc.

The somewhat prevalent idea that Nighthawks are destroyers of

young poultry is simply absurd, as it requires only a careless examination of a specimen to prove conclusively that it would be physically impossible for them to capture such prey.

The great mistake of applying improper vernacular names to birds, was clearly demonstrated during the enforcement of the scalp act of 1885, when commissioners, of whom I have knowledge, took the stand that they were obliged to allow bounty on the Nighthawk, because it was known as a "hawk."

Audubon writing of this species states that the food consists entirely of insects, especially beetles, although they also feed on moths and caterpillars, and are very expert in catching crickets and grasshoppers, with which they sometimes gorge themselves, as they fly over the ground with great rapidity. "When flying closely over the water they occasionally drink in the manner of swallows."

The food materials of eleven of these birds are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	May 5, 1879.	Chester county, Pa., ...	Flies and other insects.
2	July 20, 1879.	Delaware county, Pa., ...	Grasshoppers.
3	May 30, 1880.	Chester county, Pa., ...	Beetles and larvæ.
4	Aug. 13, 1880.	Chester county, Pa., ...	Many crickets, etc.
5	Aug. 13, 1880.	Chester county, Pa., ...	Many crickets, etc
6	Aug. 13, 1880.	Chester county, Pa., ...	Many crickets, etc.
7	May 20, 1883.	Chester county, Pa., ...	Water beetles.
8	May 28, 1883.	Chester county, Pa., ...	Beetles and two lime-like masses.
9	April —, 1885.	Orange county, Fla., ...	Various insects.
10	April —, 1885.	Orange county, Fla., ...	Beetles and large flies.
11	June 1, 1886. . . .	Chester county, Pa., ...	Various insects.

Suborder CYPSELI. Swifts.

Family MICROPODIDÆ. Swifts.

Subfamily CHÆTURINÆ. Spine-tailed Swifts.

Genus CHÆTURA Stephens.

Chætura pelagica (Linn.).

Chimney Swift; Chimney-bird.

Description (*Plate 90*).

Bill small, gape large, but not bristled; tail short, tarsus and toes naked; wings long; length about 5¼ inches; extent about 12½; wing about 5.10; sooty-brown, except throat which is much paler than other parts; wings blackish.

Habitat.—Eastern North America, north to Labrador and the Fur countries, west to the plains, and passing south of the United States in winter.

The Chimney-bird, unless resting on its nest or clinging to the sooty chimney sides, is always seen flying. In Pennsylvania these birds are generally first observed about the last week in April. In the early au-

Brown Thrush.

1, 2. Males; 3. Female.

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tumn they collect in large flocks before retiring to their winter resorts. I have observed birds of this species in Chester county (Pa.), as late as the 20th of October. In this locality the nest of the Chimney Swift, or Swallow, as it is mostly called, is composed of small twigs, which are glued together and to the sooty walls of disused chimneys with the bird's saliva.* The twigs used in constructing nests are broken off of trees by these birds when on the wing. The eggs, four or six in number, are white and unspotted. They measure about three fourths of an inch in length and about half an inch in width.

These birds subsist entirely on various kinds of insects which they collect during the night as well as in daylight.

The food materials of twelve birds which I have examined are mentioned below:

No.	Date.	Locality.	Food-Materials.
1	June 8, 1880.	Chester county, Pa.	Beetles and other small-winged insects.
2	June 8, 1880.	Chester county, Pa.	Remains of beetles and other insects.
3	June 8, 1880.	Chester county, Pa.	Dipterous insects.
4	June 8, 1880.	Chester county, Pa.	Fragments of beetles and other insects.
5	May 1, 1880.	Chester county, Pa.	Beetles.
6	May 1, 1880.	Willistown, Pa.	Beetles and small-winged insects.
7	June 8, 1883.	Newark, Delaware.	Beetles and caterpillar.
8	June 8, 1883.	Newark, Delaware,	Beetles.
9	June 8, 1883.	Newark, Delaware,	Beetles.
10	June 8, 1883.	Newark, Delaware,	Beetles and dipterous insects.
11	June 2, 1884.	Chester county, Pa.	Larvæ and flies.
12	Aug. 11, 1884.	Chester county, Pa.	Dipterous insects.

Suborder TROCHILI. Hummingbirds.

Family TROCHILIDÆ. Hummingbirds.

Genus TROCHILUS Linnæus.

Trochilus colubris Linn.

Ruby-throated Hummingbird.

Description (*Plate 56*).

Male.—Tail deeply forked, the feathers all narrow and pointed; uniform metallic green above; sides of body greenish; below white; ruby-red gorget; wings and tail purplish-black.

Female.—Metallic green of upper parts duller than in male; tail double rounded; its feathers pointed but broader than in male; no red on throat; the tail feathers banded with black; the lateral ones broadly tipped with white.

Young Male.—Very similar to adult female, but throat more or less streaked with dark; tail also more forked than in female. Nearly all specimens show a trace of metallic red on throat.

Young Female.—Throat white, without streaks or specks; tail less forked, otherwise similar to young male. Irides in old and young brown. Length about 3.25 inches; extent of wings about 5 inches.

* A writer in a recent scientific journal, which I have mislaid, says: "In the case of our own Chimney Swifts it has lately been shown that the gelatinous matter with which the twigs are fastened together is of a vegetable and not an animal character, and in a particular case recently investigated by a scientist, the gum was found to have come from a cherry tree."

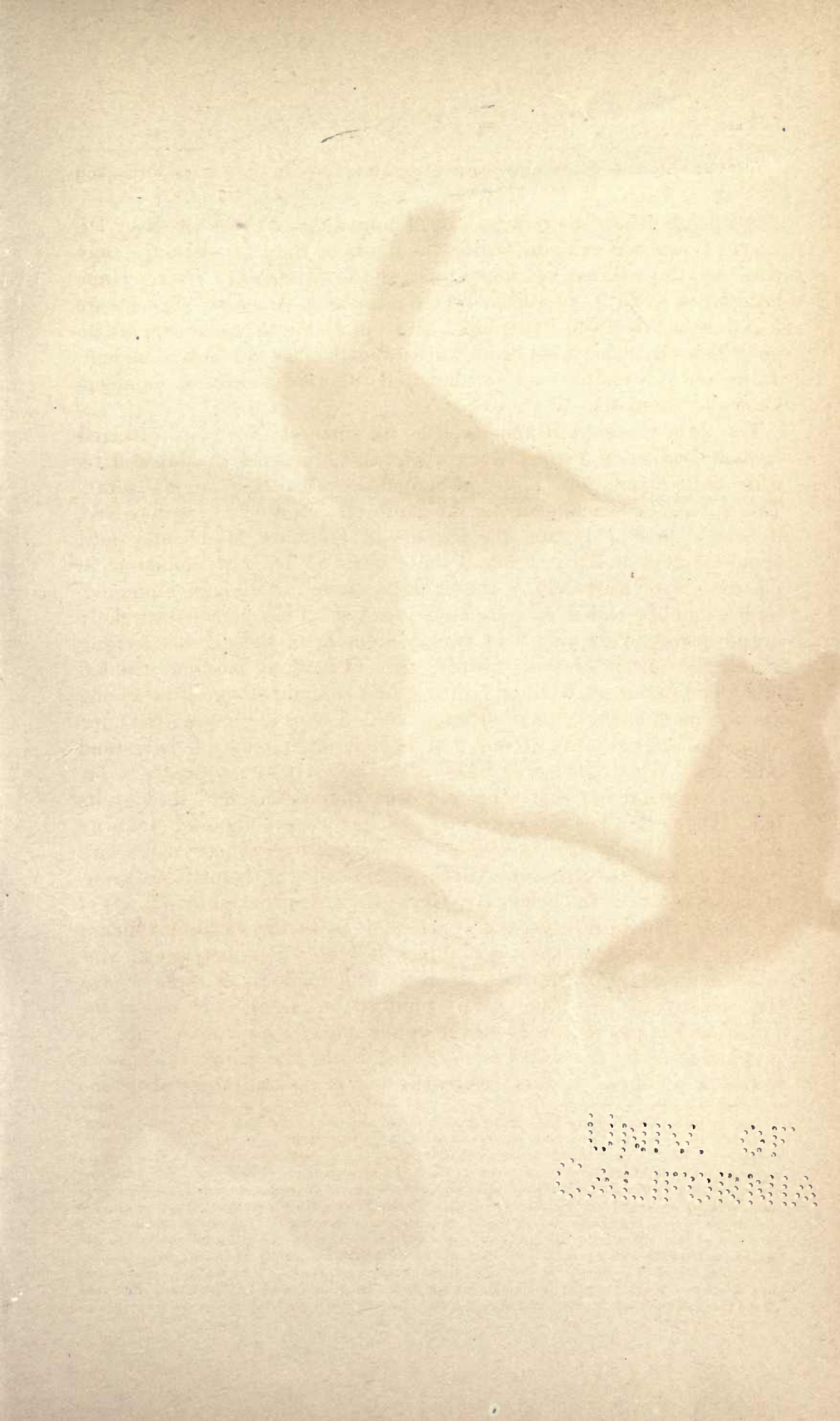
Habitat.—Eastern North America to the plains, north to the Fur countries, and south, in winter, to Cuba and Veragua.

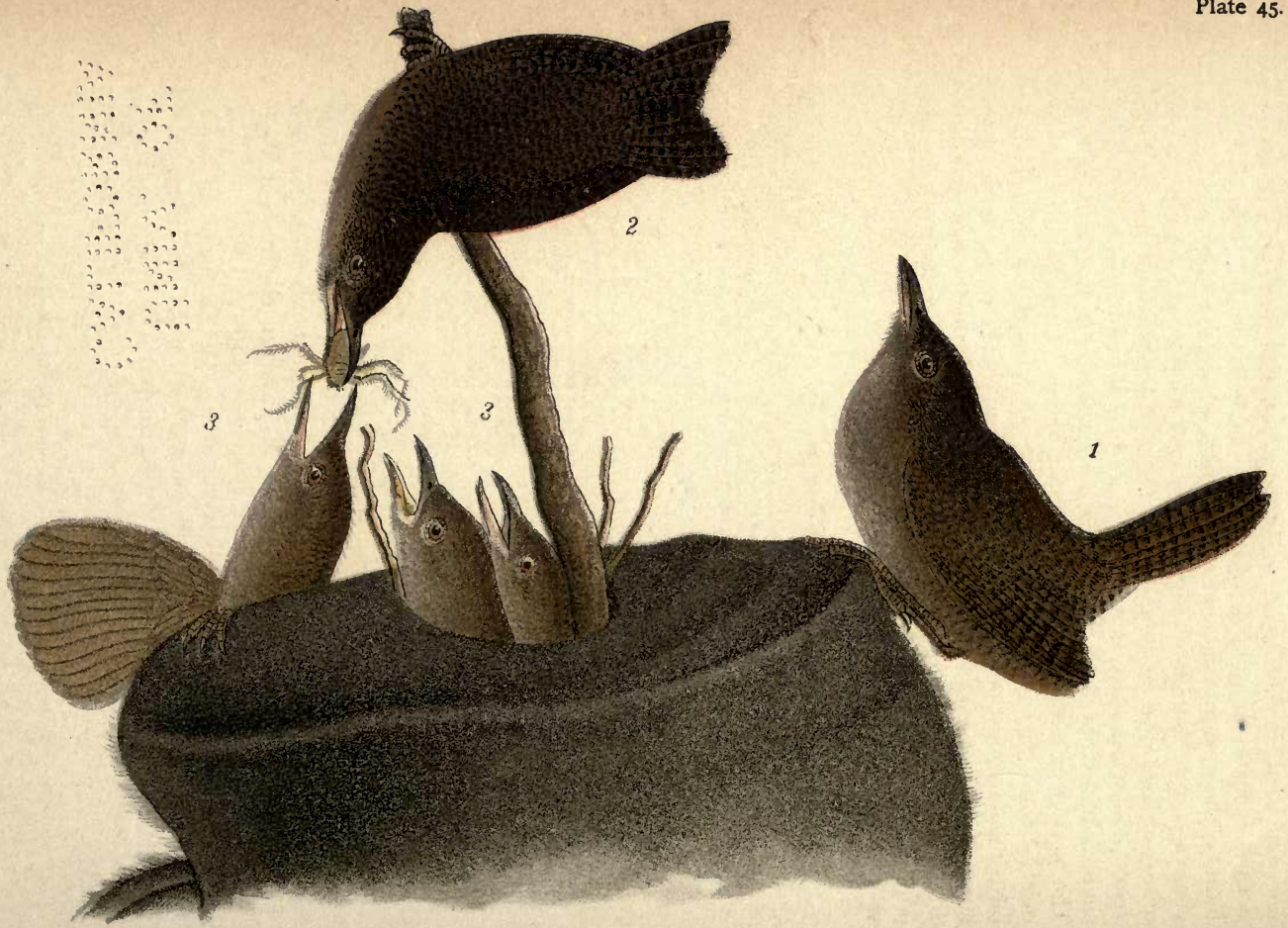
Although fifteen distinct species of hummingbirds are given by Dr. Elliott Coues, as occurring within the limits of the United States, only one—the Ruby-throat—is found east of the Mississippi river. Hummingbirds, as Dr. Coues observes, are peculiar to America. Species are found from Alaska to Patagonia. In tropical South America, particularly New Grenada, these beautiful feathered gems are most abundant. There are, it is stated, over four hundred different species of hummers known to scientists.

The Ruby-throated Hummingbirds, the smallest of all our feathered visitants, arrive in Pennsylvania about the first week in May and remain until about the middle of September, when they migrate south. This species is common during the winter in Florida, where they also, it is said, breed. During the months of February, March and until about the 20th of April, I found these birds to be quite numerous in the orange orchards along the St. John's river. Although hummingbirds cannot be called gregarious, it is not at all uncommon, especially in the spring, to see a flock of twenty or more of these birds feeding among the flowers of some favorite tree. I have, at one time, counted thirty odd hummers, feeding, fighting and pluming themselves among the flowers of a single horse-chestnut tree. I have never seen the humming bird alight on the ground, * though it often rests on twigs and branches. When sitting in trees or bushes it may frequently be observed to spread out one wing and draw the quill-feathers through its bill. The nest, a beautiful cup-shaped structure, is composed of downy substances, chiefly of a vegetable character, covered externally with lichens "which are glued on with the viscid saliva of the little workers;" in many instances the lichen coverings are strengthened by strands of cobwebs. The bird is not at all particular as to the situation which it chooses for nest-building. Sometimes it builds in a honeysuckle vine or a rose bush; at other times it erects a domicile in an apple or pear tree, usually, however, the nest is built on an oak or beech tree in the woods, and is placed mostly on the upper side of a horizontal limb. It is constructed by the united labor of both birds, who complete the work in five or six days. In this locality the nest is generally built about the

* The following interesting extract taken from a letter sent me by Mr. Charles H. Eldon, of Williamsport Pa., shows that this species *has been seen* resting on the ground:

"Near my home is a field that in the summer time is used by a florist for the cultivation of flowers. I have frequently repaired there in the evening when the hummingbirds were making their meal and seated myself quietly among the bushes (with opera glass in hand). The ruby-throats would come quite close, seemingly unaware of my presence, and dart here and there after their dainty food, or pause to sip a drop of nectar from some opening flower, ever and anon stopping for a short rest upon a stem or upon the ground. When they alight upon the ground they spread the tail to its full extent, the end against the ground, the wings slightly drooped, resting on the tail, apparently for the purpose of steadying themselves. I have seen them playfully chasing each other, starting from the ground and after several sallies or playful banters returning to the ground sitting quite close to each other, when thus seated they fluff out their feathers and appear plump (sparrow like), quite the contrary to their appearance when perched upon a twig."





House Wren.

1. Male; 2. Female; 3. Young.

last week in May. A nest now before me measures a little over one inch and a half in height and one inch and a half in diameter; the cavity is three-quarters of an inch wide and the same in depth. This nest was built on the upright limb of a beech tree, where for three consecutive years a pair of hummers regularly nested, each season building a new nest over the few remaining fragments of their abode of the previous year. The white eggs, never more than two in number, are elliptical in shape, equally obtuse at both ends and measure .50 by .33 of an inch. The period of incubation is about ten days. Occasionally, though rarely I think, two broods are reared in one season. Although these birds feed among the flowers of various plants, they prefer those of the horse chestnut, honeysuckle and trumpet vine. From the fact that these diminutive creatures are generally observed about flowering plants, the popular yet erroneous belief has arisen that they subsist entirely on the sweets of flowers.

FOOD NOTES.

No.	DATE.	LOCALITY.	FOOD-MATERIALS.
1	May 30, 1883.	West Chester, Pa.	Small worms and numerous small spiders.*
2	May 30, 1883.	West Chester, Pa.	Small flies and beetles.*
3	May 30, 1883.	West Chester, Pa.	Small flies and beetles.*
4	May 12, 1884.	West Chester, Pa.	Small flies and beetles.*
5	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
6	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
7	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
8	May 14, 1884.	West Chester, Pa.	Small green-colored beetles and flies.*
9	May 14, 1884.	West Chester, Pa.	Small green-colored beetles and flies.*
10	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
11	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
12	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
13	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
14	May 14, 1884.	West Chester, Pa.	Small green-colored beetles and spiders.*
15	May 14, 1884.	West Chester, Pa.	Small green-colored beetles and spiders.*
16	May 14, 1884.	West Chester, Pa.	Small green-colored beetles and spiders.*
17	May 14, 1884.	West Chester, Pa.	Small green-colored beetles.*
18	Aug. 3, 1884.	West Chester, Pa.	Small black beetles.
19	Aug. 5, 1884.	West Chester, Pa.	Small black beetles.
20	Aug. 5, 1884.	West Chester, Pa.	Small black beetles.

In addition to my own examinations given in the above table, it might be added that in March and April, 1885, I shot seventeen of these birds in the Florida orange orchards and found that all had only insects in their viscera. May 14, 1886, I received from Mr. George Hartman of, West Chester, Pa., fifteen hummers which had been captured while feeding among the flowers of a horse chestnut tree. The stomachs of these birds, which were kindly examined for me by Prof. C. V. Riley, entomologist, United States Department of Agriculture, Washington, D. C., showed, chiefly, the remains of small spiders and some few coleopterous insects.

* These seventeen birds were all killed when feeding in horse-chestnut trees.

ORDER PASSERES. PERCHING BIRDS.

SUBORDER CLAMATORES. SONGLESS PERCHING BIRDS.

FAMILY TYRANNIDÆ. TYRANT FLYCATCHERS.

THE FLYCATCHERS.

Of the several species of this highly beneficial family which occur in Pennsylvania as summer residents or passing visitants but two, viz: the Kingbird and common Pewee, are generally known to those who are not interested in ornithological pursuits. Both of these birds are common breeders about the habitations of man, and unlike most others of their kin are not shy or difficult to approach. Although at times some of the Flycatchers descend to the earth for food, it is safe to say that these birds, collectively considered, are seldom observed on the ground feeding. Nine representatives of this family occur in Pennsylvania, and all but two—Traill's and the Olive-sided Flycatchers—breed here regularly, and probably both birds last named breed sparingly and irregularly, within our limits. I have been informed that *traillii* has been seen here in summer, and *borealis*—a very rare visitor—Mr. August Kock is quite positive breeds occasionally in the mountainous regions of Lycoming county. Flycatchers, as the name would indicate, feed largely on winged insects, and some also subsist to a small extent, in the fall and winter especially, on small fruit of different kinds.

"The structure of the bill is admirably adapted for the capture of winged insects; the broad and deeply fissured mandibles form a capacious mouth, while the long bristles are of service in entangling the creatures in a trap and restraining their struggles to escape. The shape of the wings and tail confers the power of rapid and varied aërial evolutions necessary for the successful pursuit of active flying insects. A little practice in field ornithology will enable one to recognize the Flycatchers from their habit of perching in wait for their prey upon some prominent outpost, in a peculiar attitude, with the wings and tail drooped and vibrating in readiness for instant action, and of dashing into the air, seizing the passing insect with a quick movement and a click of the bill, and then returning to their stand. Although certain *Oscines* have somewhat the same habit, these pursue insects from place to place, instead of perching in wait at a particular spot, and their forays are not made with such admirable *élan*. Dependent entirely upon insect food, the Flycatchers are necessarily migratory in our latitude. They appear with great regularity in spring and depart on the approach of cold weather in the fall. * * * The voice, susceptible of little modulation, is usually harsh and strident, though some species have no unmusical whistle or twitter."—*Coue's Key.*

Bill broad at base, culmen flattened or rounded; the maxilla tapers to a sharp point, curved downward at the end (being hooked). The small and roundish nostrils are partly covered with bristles; gape wide with long stiff bristles; legs rather short; feet small and weak, with rather lengthened, curved and sharp-pointed claws; tail long, twelve feathers; tarsi naked; sexes alike; medium sized or very small; the larger species have blackish bills, and smaller kinds usually have yellowish colored lower mandibles; eyes brown, legs and feet blackish.

Genus, Tyrannus: Head (adults) with concealed patch of orange-red; wings long and pointed; second and third quills longest; first and fourth about equal but shorter than second and third; in adults the first two or three quills are rather abruptly narrowed near the tips; tarsus little longer than hind toe with claw; the broad and nearly even tail is shorter than the wings; plumage dark above, white below, tail broadly tipped with white.

Genus, Myiarchus: Head with well developed crest; wings long, a little rounded, about equal to long, broad and even tail; first primary shorter than sixth and

much shorter than second, third and fourth, which are about equal; tarsus a little longer than middle toe; plumage above brownish-olive, throat bluish-ash; belly white, inner webs of tail feathers decidedly rufous.

Genus, Sayornis: Head moderately crested; wings slightly pointed; third quill longest, second, fourth and fifth nearly equal; and first shorter than sixth; tail slightly forked. Tarsus decidedly longer than middle toe which is but little longer than hind toe. Plumage above brownish, darkest on head, below whitish, but in fall and winter lower parts are frequently quite yellowish.

Genus, Contopus: Head slightly crested; wings longer than the slightly forked tail and pointed; the first primary about as long as fourth; the wings are much longer than tail; tarsus short and stout; is a little longer than hind toe and scarcely as long as middle toe and claw. Plumage above olive brown, yellowish below with darkish patches on sides of breast.

Genus, Empidonax: Head slightly crested; wings rather rounded and not much longer than the nearly even tail; second, third and fourth quills about equal, form point of wing; first quill much shorter than fourth; tarsus longer than middle toe and claw, which is also decidedly longer than hind toe. Plumage greenish-brown above, more or less yellowish below and generally grayish on throat.

GENUS **TYRANNUS** CUVIER.

Tyrannus tyrannus (LINN.).

Kingbird; Beebird.

DESCRIPTION (*Plate 24*).

"Length about 8½ inches; extent about 14½ inches; above blackish-ash; top of head quite black; crown with a concealed patch of orange red; lower parts pure white, tinged with pale bluish-ash on the sides of the throat and across the breast; sides of breast and under the wings similar to, but rather lighter than the back; axillaries pale grayish-brown tipped with lighter; the wings dark-brown, darkest toward the end of the quills; the greater coverts and quills edged with white, most so on the tertials; the lesser coverts edged with paler; upper tail-coverts and upper surface of the tail glossy black, the latter very dark brown beneath; all the feathers tipped, and the exterior margined externally with white, forming a conspicuous terminal band about .25 of an inch broad.

Young.—Very similar but colors generally duller; the concealed colored patch on the crown wanting; the tail and wings in some specimens often edged with rusty."

Habitat.—Eastern North America, from British Provinces south to Central and South America. Rare west of the Rocky mountains (Utah, Nevada, Washington Territory, etc.).

This well known bird is a common summer resident in Pennsylvania, where it arrives usually about the 25th of April. The males precede the females in their arrival by some three or four days. These birds generally, I think, migrate singly; I have never observed them in the spring in small flocks. During the month of February and until the 20th of March, 1885, I saw no Kingbirds in various localities along the St. John's river, Florida, but from the 20th of March and until quite late in April these birds (in that state called Field Martins) were oftentimes met with.

The technical name *tyrannus* given to the subject of this present sketch is particularly appropriate, as this bird during the breeding season is ever on the alert, and seemingly anxious to attack his feathered

neighbors. Whenever a hawk or crow is observed flying, even at a considerable distance, this little warrior immediately starts in pursuit, and by his rapid flight speedily overtakes the object of his wrath and uttering almost continually his sharp and rapid twitter, is seen to mount above his adversary and make repeated and violent assaults on the head of his flying victim, who, frequently, to escape further persecution, makes a precipitate retreat to a tree, bushes or the ground. The nest, a rather bulky and loosely made structure, is composed of grasses, weeds, roots, etc., and is built generally on the limb of an apple or pear tree in an orchard; sometimes, however, nests are placed in oak and other trees. It is built by the joint labor of both birds, who complete this work in about five days. The eggs, usually four or five in number, are creamy-white spotted conspicuously with different shades of brown and indistinct spots of bluish-gray. The eggs vary greatly in size; a large one measures an inch in length and three-fourths of an inch in width. The period of incubation is about fourteen days. From his favorite perch either on a stake, the top of a tree or a high weed in the field, the Kingbird watches for his insect prey; at other times he is observed flying over a field in a manner similar to that of the Sparrow Hawk, watching for grasshoppers, crickets or other insects. As Wilson observes, he sometimes hovers over a river or pond, darting after insects that frequent such places, snatching them from the surface of the water, and diving about in the air like a swallow. Some few years ago I saw a Kingbird dart down to the water in a shallow pond and fly off with a shining object in his bill, that at the time I thought appeared like a small fish, but never having seen or heard of this species feeding on fishes, but little notice was taken of the bird, which flew to a tree some two hundred yards distant. From an article published in the *Forest and Stream*, September 2, 1882, and written by Milton P. Peirce, it appears that Kingbirds sometimes feed on fishes. Mr. Peirce writes: "These birds are very abundant about my premises, nesting in some cases within a few feet of my residence. * * * I have often noticed them striking the surface of the water in my fish ponds, but supposed they were either taking a bath or else catching insects which were flying near the surface of the water. When I constructed my bass pond, a few years age, I stocked it with minnows to afford ample food for the bass. At times the entire surface of the pond seems alive with them. A few days ago I observed at least a half dozen Kingbirds perched on trees and bushes, near the margin of the pond, and almost every moment some of them would dive into the water precisely like a Kingfisher, and I concluded they were catching bugs or other insects, which were floating upon the surface of the water. Watching them closely, I soon saw one of them leave the water with something preceptibly shining in its bill. It alighted on a tree about fifty yards from where I was sitting, and acted precisely as a Kingfisher does when killing a fish. Taking a telescope, I took an observation and discovered

White-breasted Nut-hatch.

1. Male; 2. Females.

To avoid
disappointment

that the Kingbird had a minnow not less than three inches long. I continued my observations for about fifteen minutes, and during that time these birds caught several small minnows and ate them." Notwithstanding the benefits which this bird confers, destroying, as Dr. Coues remarks, a thousand noxious insects for every bee it eats, many farmers and others who keep honey-bees, are ever ready to slay every Kingbird which visits their premises. Although it is believed by some that these birds take only drone bees, such is not the case, as I have found both drone and working-bees in their stomachs; Mr. Gentry, also, in speaking of the bee-eating habit states that the Kingbird is no respector of kinds. Nuttall writing of this bird says: As insects approach him, or as he darts after them, the snapping of his bill is heard, like the shutting of a watch-case, and is the certain grave of his prey. Beetles, grasshoppers, crickets and winged insects of all descriptions form his principal summer food; at times canker worms from the elm are also collected. Towards autumn, as various kinds of berries ripen, these constitute a very considerable and favorite part of his subsistence; but, with the exception of currants (of which he only eats perhaps when confined), he refuses all exotic productions, contenting himself with blackberries, whortleberries, those of the sassafras, elder and poke. The same writer further says: "Raisins, foreign currants, grapes, cherries, peaches, pears and apples were never even tasted, when offered to a bird of this kind, which I had many months as my pensioner; of the last when roasted, sometimes, however, a few mouthfuls were relished, in the absence of other more agreeable diet. Berries he always swallowed whole, grasshoppers, if too large, were pounded and broken on the floor, as he held them in his bill. To manage the larger beetles was not so easy; these he struck repeatedly against the ground and then turned them from side to side, by throwing them dexterously into the air, and the insect was uniformly caught reversed as it descended, with the agility of a practiced cup-and-ball player. At length the pieces of the beetle were swallowed, and he remained still to digest his morsel, tasting it distinctly soon after it entered the stomach, as became obvious by the ruminating motion of his mandibles. When the soluble portion was taken up, large pellets of the indigestible legs, wings and shells, as likewise the skins and seeds of berries, were, in half an hour or less, brought up and ejected from the mouth in the manner of hawks and owls. When other food failed, he appeared very well satisfied with fresh minced meat, and drank water frequently, even during the severe frosts of January. * * * Some very cold evenings he had the sagacity to retire under the shelter of a depending bed-quilt." The few examinations which I have made are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	May 5, 1880,	Chester county, Pa.,	Diptera and beetles.
2	June 9, 1880,	New Castle county, Del.,	Two honey-bees.
3	June 9, 1880,	New Castle county, Del.,	Stomach gorged with honey-bees.
4	June 13, 1880,	New Castle county, Del.,	One honey-bee.
5	June 14, 1880,	New Castle county, Del.,	Beetles and two honey-bees.
6	May 21, 1884,	Chester county, Pa.,	Beetles and other insects.
7	June 11, 1884,	Chester county, Pa.,	Diptera and raspberry seeds.
8	June 13, 1884,	New Castle, Del.,	Beetles and dipterous insects.
9	June 13, 1884,	New Castle, Del.,	Beetles and larvæ.
10	Aug. 10, 1881,	Chester county, Pa.,	Seeds and berries.
11	July 5, 1885,	Chester county, Pa.,	Various insects.
12	Aug. 11, 1885,	Chester county, Pa.,	Colorado potato beetle and seeds.

Genus **MYIARCHUS** Cabanis.

Myiarchus crinitus (Linn.).

Crested Flycatcher.

Description (*Plate 91*).

"Length about 8½ inches; extent about 13¼ inches; head with a depressed crest; upper parts dull greenish-olive, with the feathers of the crown, and to some extent of the back, showing their brown centers; upper tail-coverts turning to pale rusty-brown; small feathers at the base of the bill, sides of the head as high as the upper eyelid, sides of the neck, throat, and fore part of the breast, bluish-ashy; the rest of the lower parts, including axillaries and lower wing coverts, bright sulphur-yellow; a pale ring around the eyes; sides of the breast and body tinged with olivaceous; the wings brown, the first and second rows of coverts, with the secondary and tertial quills, margined externally with dull-white, or on the latter slightly tinged with olivaceous-yellow; primaries margined externally for more than half their length from the base with ferruginous; great portion of the inner webs of all the quills very pale ferruginous; the two middle tail feathers light brown, shafts paler, the rest have the outer web and a narrow line on the inner sides of the shaft brown, pale olivaceous on the outer edge, the remainder ferruginous to the very tip; outer web of exterior feather dull brownish-yellow; bill dark-brown above and at the tip below, paler towards the base."—*B. B. of N. A.*

Habitat.—Eastern United States and Southern Canada, west to the plains, south through eastern Mexico to Costa Rica.

The Crested Flycatcher, although probably not as abundant as the preceding species, is a common summer resident in Pennsylvania. I have seen these birds in the southern portions of this State as early as the 23d of April, usually, however, they arrive about the first of May, and remain until late in September, when they migrate southward and winter, it is stated, beyond the southern borders of the United States. Although this species sometimes nests in orchards and other places near houses, it is chiefly found in wooded districts. Unlike all other of our flycatchers, these birds build their nests in holes of trees, and occasionally in hollow fence rails or posts. I have examined thirteen nests of the Crested Flycatcher, which were found in Pennsylvania, and in ten of this number discovered the remains of cast off skins of snakes. The eggs, usually five, are of a creamy brown ground color with numerous dark brownish blotches or spots and lines, the latter generally of a purp-

lish tint appear as if traced with a pen. The eggs measure about .86 long by .65 wide. The nest of this bird is constructed of various materials, such as feathers, hay, leaves, etc. Mr. Gentry some few years ago found a nest of this species, near Germantown, which was placed between the bifurcated branch of an apple tree. "It was composed almost entirely of feathers of our common *Gallus*, which were held together by long grasses." The note of this bird is a harsh squeak or kind of whistle, exceedingly unpleasant to the ear, and which can be heard to a considerable distance. The food of this species is mainly of an insectivorous nature; in the late summer and autumn different kinds of berries are oftentimes fed upon. Some writers state that the Crested Flycatchers like the Kingbirds, are equally fond of honey-bees. Mr. Gentry says: "From the vast numbers of ground beetles, which have been noticed in the numerous stomachs which we have examined, it is obvious that the species leads almost wholly a terrestrial existence for a week or so after its arrival. As the season advances, and the higher types of insects swarm into existence, it becomes more exclusively arboreal and aërial, so to speak. We have watched these birds for hours, while perched upon a dead branch of a tree, in the active enjoyment of procuring a full meal. Their movements are perfectly ludicrous. There they sit, bobbing the head this way and then that way, now up and then down, ever on the alert for caitiffs, which form their appropriate diet. Hosts of lepidoptera, both larvæ and imagoes, are greedily devoured."

In the following table will be found the results of the few examinations which I have made of the Crested Flycatcher:

No.	Date.	Locality.	Food-Materials.
1	May 17, 1880,	Chester county, Pa.,	Large flies.
2	May 17, 1880,	Chester county, Pa.,	Beetles.
3	May 30, 1881,	Chester county, Pa.,	Beetles and flies.
4	May 14, 1882,	Chester county, Pa.,	Beetles and larvæ.
5	June 8, 1883,	New Castle Delaware,	Larvæ.
6	June 8, 1883,	New Castle, Delaware,	Butterflies.
7	June 8, 1883,	New Castle, Delaware,	Beetles.
8	Sept. 12, 1883,	Chester county, Pa.,	Berries and beetles.
9	Aug. 7, 1884,	Chester county, Pa.,	Seeds and pulp of berries.

Genus **SAYORNIS** Bonaparte.

Sayornis phœbe (Lath.).

Phœbe; Pewee.

Description (*Plate 91*).

"Sides of breast and upper parts dull olive-brown, fading slightly toward the tail; top and sides of head dark-brown; a few dull white feathers on the eyelids; lower parts dull yellowish-white, mixed with brown on the chin, and in some individuals across the breast; quills brown, the outer primary, secondaries, and tertials edged with dull white; in some individuals the greater coverts faintly edged with dull-white; tail brown, outer edge of lateral feathers dull-white, outer edges of the rest

like the back; tibiæ brown; bill and feet black; bill slender, edges nearly straight; tail rather broad, and slightly forked, third quill longest, second and fourth nearly equal, the first shorter than sixth.

"In autumn, and occasionally in early spring, the colors are much clearer and brighter. Whole lower parts sometimes bright sulphur-yellow, above greenish-olive, top and sides of head tinged with sooty; in the young of the year, the colors are much duller; all the wing-coverts broadly tipped with light ferruginous, as also the extreme ends of the wings and tail feathers; the brown is prevalent on the whole throat and breast; the hind part of the back, rump, and tail, strongly ferruginous. Length about 7 inches; extent about 11 inches."—*B. B. of N. A.*

Habitat.—Eastern North America, from the British Provinces south to eastern Mexico and Cuba, wintering from the south Atlantic and Gulf states southward.

The Phœbe bird or Pewee, so named from its note, is one of our earliest spring migrants; it arrives in Pennsylvania mostly about the middle of March, and continues in this region until about the 15th of October. A few individuals sometimes linger as late as the first of November. In the early part of February, 1883, I saw Mr. C. D. Wood, of Philadelphia, skinning a Pewee which had been shot on the 22d of January, 1883, at Spring City, Chester county, Pa.

In Cecil county, Maryland, and the southern portion of Delaware, I have, on different occasions, seen these birds as late as the 25th of November. During the latter part of February, 1885, when camping at Drayton Island, in Lake George, Florida, I obtained five of these fly-catchers, and found that all had fed chiefly on Palmetto berries. The nest is generally built under a bridge or shelving rocks; oftentimes, however, this species is found breeding about barns and other buildings. Although the Pewee seldom breeds in the woods, it occasionally builds its nests against the dirt covered roots of trees which have been blown over; I have twice found their nests, in forests, placed in these situations. Both sexes engage in building their nest, which is completed in about six days. The materials used in its construction are mosses, grasses, fine roots, mud, feathers, etc. The eggs, usually five in number, are pure white and unspotted; sometimes, however they are faintly spotted with reddish-brown. They measure about .80 of an inch in length, and .55 of an inch in width. Incubation, which is engaged in only by the female, lasts for a period of about twelve days. During the late summer, autumn and winter, I have noticed that these birds, in addition to various insects, feed to a considerable extent on different kinds of fruits, such as those of the raspberry, blackberry, poke, wild-grape and cedar. The young of this species are fed exclusively on insects.

The food materials of sixteen Pewees examined by the writer are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	Mar. 31, 1880.	New Castle county, Del.	Beetles.
2	Mar. 31, 1880.	New Castle county, Del.	Purple colored insects (diptera).
3	Mar. 31, 1880.	New Castle county, Del.	Various insects (principally diptera).
4	Sept. 11, 1880.	East Bradford, Pa.	Flies and remains of beetles.
5	Oct. 2, 1880.	East Bradford, Pa.	Beetles and small flies.
6	Oct. 4, 1880.	East Bradford, Pa.	Flies and small berries.
7	Oct. 6, 1880.	Willistown, Pa.	Flies and beetles.*
8	Oct. 6, 1880.	Willistown, Pa.	Small worms and remains of beetles.*
9	Oct. 6, 1880.	Willistown, Pa.	Grasshoppers and flies.*
10	Oct. 6, 1880.	Willistown, Pa.	Several large yellow wasp-like insects.*
11	Oct. 6, 1880.	Willistown, Pa.	Numerous flies.*
12	Oct. 7, 1880.	Willistown, Pa.	Large wasp-like insect.*
13	Oct. 7, 1880.	Willistown, Pa.	Large wasp-like insect.*
14	Sept. 30, 1882.	Chester county, Pa.	Beetles, grasshoppers and crickets.
15	Sept. 30, 1882.	Chester county, Pa.	Beetles and flies.
16	Sept. 30, 1882.	Chester county, Pa.	Grasshoppers and few beetles.

Genus **CONTOPUS** Cabanis.

Contopus virens (Linn.).

Wood Pewee.

Description (*Plate 91*).

Length about 6¼ inches; extent about 10; above dusky brownish-olive, darkest on head; sides of head, neck and breast similar, but much paler on breast; lower parts light-yellowish, the latter most conspicuous on middle of belly; narrow white ring around eye; two white wing bars; upper mandible blackish, lower yellow (in young lower mandible is dusky). The young are duller in plumage and whitish markings on wings, as well as feathers of upper parts, more or less edged with pale rusty.

Habitat.—Eastern North America to the plains, and from southern Canada southward.

The Wood Pewee, a common summer resident, arrives in Pennsylvania early in May and continues with us until about September 20. This bird is found commonly in forests or the shady retreats of apple orchards. During the breeding season, particularly, the Wood Pewee when perched on the dead branches of trees, watching for his insect prey, utters a peculiar plaintive drawling note—"*pe-a-wee, a-pee-wee!*"—which once heard is rarely forgotten. A writer has very properly said that these notes in the latter part of the summer are almost the only ones heard in the woods. The thin-bottomed, thick-walled and somewhat saucer-shaped nest, built usually on a thick, horizontal tree limb, is composed, internally, of grass stems, fine fibers of roots or other soft substances, and covered externally with lichens, which are held in place by cobwebs or "glued to the other materials by the birds saliva." The eggs, four or five in number, are yellowish-white, with reddish-brown and lilac spots, generally in a ring about the larger end. They measure about .75 of an inch in length, and a little over .50 of an inch in width. I have never found Wood Pewees feeding on small fruits, but have always observed that they feed exclusively on insects. Audubon, however, states, during the winter months, he has observed these birds in

* Taken in the mornings' feeding near a pond.

Florida, Louisiana and other of the southern states, feeding on "different berries, as well as insects."

The stomach contents of thirteen of these birds which I have captured during the summer time, in different sections of the state, consisted of flies, small beetles, butterflies, etc.

Contopus borealis (SWAINS.).

Olive-sided Flycatcher.

DESCRIPTION.

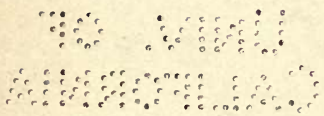
"Wings long, much pointed; second quill longest; first longer than third. Tail deeply forked. Tarsi short. The upper parts ashy-brown, showing dark-brown centres of the feathers; this is eminently the case on the top of the head; the sides of the head and neck, of the breast and body resembling the back, but the edges of the feathers tinged with gray, leaving a darker central streak. The chin, throat, narrow line down middle of breast and abdomen, and lower tail-coverts white, or sometimes with a faint tinge of yellow. The lower tail-coverts somewhat streaked with brown in the center. On each side of rump generally concealed by the wings, is an elongated bunch of white silky feathers. The wings and tail very dark-brown, the former with the edges of secondaries and tertials edged with dull-white. The lower wing-coverts and axillaries grayish-brown. The tips of the primaries and tail feathers rather paler. Feet and upper mandible black; lower mandible brown. The young of the year similar, but the color duller; edges of wing feathers dull-rusty instead of grayish-white. The feet light brown. Length 7½; extent about 13¼; wing, 4.33; tail, 3.30; tarsus .60."—*Hist. N. Am. B.*

Habitat.—North America, breeding from the northern and the higher mountainous parts of the United States northward. In winter, south to Central America, etc.

The Olive-sided Flycatcher, by far the rarest of all the family found in this state, arrives here about the first week in May. Judge Libhart states that this species (probably fifteen or twenty years ago) was found as a breeder in Lancaster county, where, however, in recent years it has been observed by Dr. Treichler and others only as a very rare spring and fall migrant. Prof. August Kock says it is seldom seen, but he is quite positive that it breeds occasionally in the mountains of Lycoming county, and Prof. H. J. Roddy is also of the opinion that it occurs as a rare breeder in parts of Perry county. Mr. Geo. B. Sennett, of Erie; H. C. Kirkpatrick, of Crawford; Dr. J. W. Detwiller, of Northampton, and Dr. W. Van Fleet, of Clinton, are the only naturalists, other than those previously mentioned, whose reports have been sent to me and in which reference is made to this bird, and they all record it as a rare migrant in the spring and fall. A few specimens of this species have been captured at irregular intervals, in the spring and fall, in Chester, Delaware and Philadelphia counties during the past fifteen years.

Blackcap Titmouse.

1. Male; 2 Female.



Genus **EMPIDONAX** Cabanis.

Empidonax flaviventris Baird.

Yellow-bellied Flycatcher.

Description.

Bill short and very broad; length about 5½; extent about 8½; tail about 2.60; wing about 2.40; above olive-green, in fact decidedly greenish; lining of wings and lower parts sulphur-yellow, very decided, except on breast which is similar to back, but paler; wing bars yellowish-white; well marked yellow ring around eye; upper mandible blackish, the lower yellow.

Habitat.—Eastern North America to the plains, and from southern Labrador south through eastern Mexico to Panama, breeding from the northern states northward.

The Yellow-bellied Flycatcher is reported by numerous observers to be a regular summer resident in various parts of the state, especially in the mountainous districts. Prof. August Kock, writing of this bird in Lycoming county, says it "breeds in tangled thickets; in almost every such thicket, interwoven with thorns and near a stream, a pair may be observed through the summer." I have never found the nest or eggs of this flycatcher. Dr. Coues states that it nests "in swamps, *close* to *ground*, in a stump, log, or roots of an upturned tree, thick and bulky, of mosses, etc., deeply cupped." The eggs are said to be usually four, measuring about .70 × .50, buffy or creamy-white, spotted chiefly about larger end with reddish-brown.

The note as described by Dr. Coues is a low soft *pe-a*, uttered slowly. The Yellow-bellied Flycatcher is usually seen perched on the low limbs of trees or bushes, along the borders of streams or ponds in the woods. I have never observed it on the high branches of trees. According to Mr. Gentry it is occasionally observed on the ground, in active pursuit of insects, which contribute to its bill of fare. In the few examinations which I have made of this species the following insects were found:

No.	Date.	Locality.	Food-Materials.
1	September 22, 1880,	Chester county, Pa.,	Beetles.
2	September 24, 1880,	Chester county, Pa.,	Small flies.
3	September 25, 1880,	Chester county, Pa.,	Beetles and flies.
4	September 30, 1880,	Chester county, Pa.,	Grasshopper.

Empidonax acadicus (Gmel.).

Acadian Flycatcher; "Hick-up."

Description (*Plate 91*).

Length about 6¼ inches; extent about 9¼; above grayish-green; below whitish; throat and middle of belly white.

Habitat.—Eastern United States, chiefly southward, west to the plains, south to Cuba and Costa Rica.

For a period of about five months, or from early in May until late in September, the Acadian Flycatcher is a common resident in Pennsylvania, frequenting chiefly woodland. This species is somewhat shy and difficult to approach, and like the Cuckoo or Yellow-breasted Chat, is oftener heard than seen. I have heard this bird called "Hick-up" from its peculiar note. The shallow, saucer-shaped and loosely made nest is placed usually on a drooping and forked branch of a tree in the forest, a dog-wood, beech or hickory generally being selected. It is composed of blossoms, grasses, fine rootlets or fine pieces of bark. The majority of nests which I have found in the vicinity of West Chester, Pa., were built entirely of blossoms. The nests are rarely more than eight or ten feet from the ground, and are so open at the bottom that the eggs can readily be seen from below. The eggs, usually three in number, are very similar in size, etc., to those of the Wood Pewee—they are creamy-white, spotted with reddish-brown. During the late summer and autumn months this species subsists to a limited extent on various kinds of berries.

The food materials of seven of these birds are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	May 10, 1879.	Chester county, Pa.	Beetles.
2	June 11, 1880.	Chester county, Pa.	Large flies and larvæ.
3	June 20, 1880.	Chester county, Pa.	Various insects.
4	Aug. 20, 1882.	Chester county, Pa.	Berries.
5	Aug. 30, 1882.	Chester county, Pa.	Beetles and flies.
6	Sept. 20, 1882.	Chester county, Pa.	Insects.
7	May 20, 1883.	Chester county, Pa.	Beetles.

Empidonax pusillus traillii (Aud.).

Traill's Flycatcher.

Description.

"Upper parts dark olive-green, lighter under the wings, and duller and more tinged with ash on nape and sides of the neck; center of the crown feathers brown; a pale yellowish-white ring (in some specimens altogether white) round the eye; loral feathers mixed with white; chin and throat white; the breast and sides of throat light-ash tinged with olive, its intensity varying in individuals, the former sometimes faintly tinged with olive; sides of the breast much like the back; middle of the belly nearly white; sides of the belly, abdomen and the lower tail-coverts sulphur-yellow; the quills and tail-feathers dark-brown, as dark (if not more so) as these parts in *C. virens;* two olivaceous yellow white bands on the wing, formed by the tips of the first and second coverts, succeeded by a brown one; the edge of the first primary and of secondaries and tertials a little lighter shade of the same; the outer edge of the tail feathers like the back, that of the lateral one rather lighter; bill above dark brown, dull brownish beneath; iris brown. Length nearly 6 inches; extent about 8.75 inches."—*B. B. of N. A.*

Habitat.—Eastern North America, breeding from the Middle States (southern Illinois and Missouri) northward; in winter south to Central America.

Traill's Flycatcher, a somewhat suspicious frequenter of thickets, near

streams or ponds, I have found in Pennsylvania only as a rare spring and autumnal migrant. In the spring it arrives generally early in May; when returning to its winter resorts beyond the southern limits of the United States, it is again seen, but only for a few days, about the twentieth of September. In addition to insects, this species, it is stated, feeds also on different kinds of berries.

I have been informed that Traill's Flycatcher has been seen in the mountainous parts of this state during the summer. Possibly it breeds here. Its eggs, it is said, are hardly distinguishable from those of *acadicus*, and the nest is not *flat* like that of the Acadian Flycatcher. The note, of *traillii*, is described by Coues as "a flat *kéwink, kéwink*, slowly."

Empidonax minimus Baird.

Least Flycatcher.

Description.

Length about 5½ inches; extent about 8; above grayish-olive, darkest on head, and much paler on rump and upper tail-coverts; middle of back decidedly olivaceous; ring about eye and few loral feathers white; sides of head and neck ashy; lower parts whitish with yellowish toward base of tail; wing bars white.

Habitat.—Eastern North America, south in winter to Central America. Breeds from the northern states northward.

The Least Flycatcher is a common summer resident in many parts of Pennsylvania. During the last two years I have found this species to be very numerous in different sections of Crawford, Erie, McKean, Cambria and other counties in the summer time. This bird, I have noticed, frequents the edges of woods, thickets and also gardens and orchards. "Nest in *upright* crotch of tree, shrub or sapling; small neat, compact-walled, deeply cupped; eggs three to four, *white*, normally unmarked, *rarely* speckled, .60 to .69 long, averaging .65 by .51. Note a sharp *che-bec'*, or *se-wick'*."—*Coues.*

Suborder OSCINES. Song Birds.

Family **ALAUDIDÆ.** Larks.

Genus **OTOCORIS** Bonaparte.

Otocoris alpestris (Linn.).

Horned Lark.

Description.

Length about 7½ inches; extent about 14; bill and legs blackish; eyes brown. Upper parts grayish-brown and pinkish-brown; this pinkish color is brightest on nape, rump and lesser wing-coverts; back much streaked with dusky. A streak from bill runs back below eye and on sides of head, and pectoral patch, black. Fore-

head and line over eye and lower parts except the sides, and sides of breast, which are very similar to back, white, long tufts or "horns" black ; chin and throat yellow ; very long hind claw ; middle tail feathers about same as back ; the rest black, the outer pair with white outer webs.

Habitat.—Northeastern North America, Greenland and northern parts of the Old World ; in winter south in the eastern United States to the Carolinas, Illinois, etc.

The Horned Lark is a somewhat common winter resident in eastern Pennsylvania. It arrives in this region, from its northern breeding grounds, early in November, and remains until about the last week in February. These birds, during their residence with us, are usually found in small parties of twelve or twenty, occasionally, however, flocks of a hundred or more are seen. The Horned Larks frequent fields, or other similar open situations, where seeds of different weeds and grasses are procurable. When deep snows cover their favorite feeding grounds, they oftentimes are observed in public roads throughout the country districts searching for food; they also at times, when driven by hunger, visit barnyards.

According to Nuttall their food consists of various kinds of seeds which remain on the grass and weeds, and the eggs and dormant larvæ of insects, when they fall in their way. In the stomachs of thirteen of these birds, taken in Chester and Delaware counties (Pa.), I found that eleven had fed on different kinds of small seeds; two, in addition to small seeds, had fed on grain (particles of corn and oats).

The Prairie Horned Lark (*O. a. praticola*, Hensh.,) is the common form in the region of Lake Erie, where it occurs as a regular summer resident. This last named geographical "race" or variety, is the bird which occurs throughout the western and central parts of the state. It is smaller and paler in color than the typical *alpestris*. The nest is built in a depression of the ground in a field, the eggs, said to be usually four in number, are described as a light-greenish or dull-greenish buff, spotted with different shades of brown.

NOTE.—In the spring of 1852 Mr. John Gorgas, of Wilmington, Delaware, liberated about fifty Skylarks (*Alauda arvensis*, Linn.), which he had imported from England, near the city of Wilmington. For a period of about two years these birds were seen at irregular intervals in the counties of Chester and Delaware, Pa., but in the fall of 1854, I am informed by Mr. B. M. Everhart, of West Chester, they disappeared and have not since been seen.

FAMILY **CORVIDÆ**. CROWS, JAYS, ETC.

THE CROWS AND JAYS.

Five species of this family are found in Pennsylvania. The American Crow and Blue Jay are two of the best known species, both are common and are found with us during all seasons. The Fish Crow occurs as a summer resident in a few localities in southeastern Pennsylvania, chiefly along the Delaware and Susquehanna rivers. The Raven, a resident in the wildest of our mountainous regions, is, in some

Golden-crested Kinglet.

1. Male; 2. Female.

parts, reported to be quite plentiful, and the Canada Jay—called also Whisky Jack and Moose-bird—which breeds from Maine northward, is found here only as a rare straggler in winter. Although of an omnivorous nature, these birds feed chiefly on an animal diet.

"Primaries ten; the first short, usually about half as long as the second; the four outer sinuated on the inner edge. Nostrils concealed by narrow stiffened bristles or bristly feathers directed forwards. Tarsi scutellate anteriorly, the sides undivided (except sometimes below) and separated from anterior plates by a narrow naked strip, sometimes filled up with small scales. Basal joint of middle toe united for about half its length to each lateral one."

SUBFAMILY **GARRULINÆ**. JAYS.

GENUS **CYANOCITTA** STRICKLAND.

Cyanocitta cristata (LINN.).

Blue Jay; Jay-bird.

DESCRIPTION (*Plate 25*).

Head crested; bill rather slender; length about 12 inches; extent about 17; bill and legs black; eyes brown; crest and upper back a light purplish-blue; wings and tail bright blue; lower parts whitish and grayish-white, crossed on lower throat by a black collar which unites with black feathers on sides of head and crest; narrow frontal line and lores black.

Habitat.—Eastern North America to the plains, and from the Fur countries south to Florida and eastern Texas.

The Blue Jay is found in Pennsylvania during all seasons of the year, but in the autumn and summer months this species is much more plentiful than at other periods. This beautiful bird is an inhabitant chiefly of forests. During the breeding season the Jays associate in pairs, but in the late summer and autumn it is not unusual to find them in small flocks. I have seen on several occasions as many as twenty-five of these birds feeding in beech, chestnut or cedar trees. Both sexes engage in nest-building, which, in this latitude, is begun about the 20th of April. A nest which I saw the birds building was completed in five days. The nest, a strong bulky structure, composed chiefly of twigs and fine roots, is placed commonly in a tree in the woods; sometimes, though rarely in this locality, nests are built in low bushes. The eggs, four to six in number, mostly five, are greenish or brownish-gray, spotted with brown. Length about 1.15 inches, width .84 of an inch. In Florida the Blue Jay * nests some five or six weeks earlier than in this latitude, at least I suppose this to be the case, as I have seen these birds collecting sticks, etc., as early as the first week in March. The Blue Jay and also the "Scrub Jay" (*Aphelocoma floridana*), are in bad repute among the Florida farmers, from the fact that they (particularly the "Scrub Jay") suck the eggs of chickens.

Audubon writing of the Blue Jay says:

* The Florida Blue Jay, a local race technically styled *Cyanocitta cristata florincola*, is smaller and has less white on tips of secondary and tail feathers than *C. cristata*.

"It robs every nest it can find, sucks the eggs like the crow, or tears to pieces and devours the young birds. A friend once wounded a Grouse (*Bonasa umbellus*), and marked the direction which it followed, but had not proceeded two hundred yards in pursuit, when he heard something fluttering in the bushes, and found his bird belabored by two blue jays who were picking out its eyes. The same person once put a flying squirrel into the cage of one of these birds, merely to preserve it for one night; but on looking into the cage about eleven o'clock next day he found the mammal partly eaten. A Blue Jay at Charleston destroyed all the birds of an aviary. One after another had been killed, and the rats were supposed to have been the culprits, but no crevice could be seen large enough to admit one. Then the mice were accused, and war was waged against them, but still the birds continued to be killed; first the smaller, then the larger, until at length the Keywest Pigeons; when it was discovered that a Jay which had been raised in the aviary was the depredator. He was taken out and placed in a cage, with a quantity of corn, flour and several small birds which he had just killed. The birds he soon devoured, but the flour he would not condescend to eat, and refusing every other kind of food, soon died. In the north it is fond of ripe chestnuts, and in visiting the trees is sure to select the choicest. When these fail it attacks the beech nuts, acorns, peas, apples and green corn. In Louisiana they are so abundant as to prove a nuisance to the farmers, picking the newly-planted corn, the peas and the sweet potatoes, attacking every fruit tree, and even destroying the eggs of pigeons and domestic fowls. The planters are in the habit of occasionally soaking some corn in a solution of arsenic, and scattering the seeds over the ground, in consequence of which many Jays are found dead about the fields and gardens."

In reference to the food of this species, Mr. E. A. Samuels * writes as follows: "Its food is more varied than that of almost any other bird that we have. In winter the berries of the cedar, barberry or blackthorn, with the few eggs or cocoons of insects that it is able to find, constitute its chief sustenance. In early spring the opening buds of shrubs, caterpillars and other insects, afford it a meagre diet. Later in the spring, and through the greater part of summer, the eggs and young of the smaller birds constitute its chief food, varied by a few insects and early berries. Later in the summer, and in early autumn, small fruits, grains, and a few insects afford it a bountiful provender; and later in the autumn when the frosts have burst open the burs of chestnuts and beechnuts and exposed the brown ripe fruit to view, these form a palatable and acceptable food, and a large share of these delicious nuts fall to the portion of these busy and garrulous birds."

The food materials of Jays which I have examined are given in the following table:

* Our Northern and Eastern Birds, p. 365.

American Robin.

1. Male; 2. Female and young.

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No.	Date.	Locality.	Food-materials.
1	October, 1880,	Chester county, Pa.,	Acorns.
2	October, 1880,	Chester county, Pa.,	Acorns.
3	October, 1880,	Chester county, Pa.,	Acorns.
4	October, 1880,	Chester county, Pa.,	Acorns.
5	October, 1880,	Chester county, Pa.,	Acorns.
6	May 10, 1880,	New Castle, Delaware,	Beetles and sand.
7	May 18, 1880,	New Castle, Delaware,	Corn.
8	June 11, 1880,	New Castle, Delaware,	Beetles and berries.
9	Sept. 28, 1882,	Chester county, Pa.,	Indian corn and beetles.
10	Sept. 21, 1882,	Chester county, Pa.,	Indian corn and acorns.
11	Sept. 21, 1882,	Chester county, Pa.,	Indian corn and acorns.
12	May 25, 1883,	Chester county, Pa.,	Vegetable matter, not determined.
13	May 25, 1883,	Chester county, Pa.,	Black colored beetles and sand.
14	May 25, 1883,	Chester county, Pa.,	Green colored beetles.
15	May 25, 1883,	Chester county, Pa.,	Black colored beetles, sand and small shells.
16	May 25, 1883,	Chester county, Pa.,	"June bugs" and few other insects.
17	May 25, 1883,	Chester county, Pa.,	"June bugs" and few other insects.
18	May 25, 1883,	Chester county, Pa.,	"June bugs."
19	May 25, 1883,	Chester county, Pa.,	"June bugs."
20	May 25, 1883,	Chester county, Pa.,	"June bugs."
21	May 12, 1883,	Chester county, Pa.,	Beetles.
22	May 12, 1883,	Chester county, Pa.,	Beetles.
23	May 8, 1883,	Chester county, Pa.,	Chiefly Indian corn; few beetles.

Genus PERISOREUS Bonaparte.

Perisoreus canadensis (Linn.).

Canada Jay.

Description.

"Gray, whitening on head, neck and breast; a dark cap on hind head and nape, separated by a gray cervical collar from the ashy-plumbeous back; wings and tail plumbeous, the feathers obscurely tipped with whitish. Bill and feet black; young much darker, sooty or smoky brown. * * * Length 10 inches; extent about 16; wing 5.25 to 5.75; tail rather more graduated; tarsus 1.33; bill under 1, shaped like a titmouse's."—*Coues.*

Habitat.—Northern New England and New York, Michigan and Canada, northward to Arctic America.

The Canada Jay—a very rare and irregular straggler in winter from the north—I have never met with in this state. Dr. A. C. Treichler, of Elizabethtown, has one in his collection which was captured in Lancaster county, February, 1889. This is the only specimen, so far as I can learn, that has been taken in Pennsylvania during the last twenty-five years.

Subfamily CORVINÆ. Crows.

Genus CORVUS Linnæus.

Corvus corax *principalis Ridgw.

Northern Raven.

Description.

Size large; entire plumage glossy black with purplish reflections; feathers of throat lengthened, disconnected and pointed; bill large and like feet black; length about 2 feet; extent 4 feet or more.

* Not having any specimens of Pennsylvania Ravens in my possession, I am unable to state positively whether the bird found here is the form known as *sinuatus*, which occurs as a common resident in the regions west of the Mississippi, or the new sub-species *principalis*. In the present state of uncertainty I deem it best to consider our bird as the northern form.

"*Habitat.*—Northern North America, from Greenland to Alaska, south to British Columbia, Canada, New Brunswick, etc."—*Ridgway.*

Of all the numerous birds found in Pennsylvania the Raven seems to be one of the most wily and difficult to secure. Although not abundant anywhere in this commonwealth, these birds are probably more frequently met with in portions of Sullivan, Elk, Centre, Cameron, Lycoming, Clinton and Clearfield counties than elsewhere. The nest of this bird, a bulky structure of sticks, bark, moss, etc., is said to be built in March or April, and is placed in trees or sometimes on rocky ledges. The following list and notes from different observers will give a very clear idea of the localities in our state where the Raven occurs regularly:

COUNTY.	OBSERVERS.	REMARKS.
Allegheny. . .	T. Z. Hazzard.	Straggler.
Bradford, . . .	J. L. Camp.	Resident in mountains; scarce.
Do. . . .	J. W. Kitcham, ...	Resident; breeds sparingly.
Berks, ...	D. F. Keller, ...	Straggler: very rare.
Columbia, . . .	Dr. A. B. McCrea, ...	Resident.*
Clinton, ...	Dr. W. Van Fleet.	Resident; breeds regularly.
Clearfield. . .	Dr. W. Van Fleet, ...	Resident; breeds regularly.
Cameron, . . .	M. M. Larrabee, ...	Resident; regular breeder.
Do. . . .	Sylvester Belden.	Resident; regular breeder.
Centre. . . .	J. Preston Thomas, ...	Resident; tolerably common in mountains
Elk.	Chas. H. Eldon, ...	Resident.
Erie, ...	Geo. B. Sennett, ...	Straggler.
Do.	John W. Detwiller, M. D.,	Saw one at Lake Erie in winter.
Franklin, . . .	H. B. Craig, ...	A few reside in mountainous regions.
Lycoming. . . .	August Kock, ...	Resident.
Do. . . .	Chas. H. Eldon, ...	Resident.†
Lackawanna, .	G. P. Friant, ...	A few seen in recent years; probably resident.
Potter, ...	B. H. Warren, ...	Resident; have seen them in summer and winter.
Sullivan, . . .	Otto Behr, ...	Resident; regular breeder.
Somerset, . . .	Dr. H. D. Moore, ...	Very rare; probably breeds.
Susquehanna. .	Geo. B. Perry, ...	Resident; breeds regularly.
Venango, . . .	J. R. Robertson.	Rare visitor.
Westmoreland,	Chas. H. Townsend. . . .	Old residents report a "Crow" of very large size, as once common. It was doubtless the Raven.
York, ...	Hon. G. C. Brown, ...	Rare visitor; probably breeds.

Mr. J. H. Ferguson, of Renovo, Clinton county, says Ravens are to be found about nine miles south of Renovo, in the mountains. When deer are killed and eviscerated these birds come about to feed on the refuse matter; generally seen in pairs, but sometimes several are together. It is a common custom for this bird to visit deserted camps; soon as lumbermen or hunters have left their camps a Raven, or several of them, will be seen in the tops of tall trees, and shortly they will be observed near the smoldering embers of the dying fire, picking up the fragments of food.

Corvus americanus AUD.

American Crow.

DESCRIPTION (*Plate 57*).

Bill, legs and feet black; iris brown; plumage glossy black with violet reflections, brightest on wing-coverts, tail and back; top of head frequently without metallic tint—*young* usually dull black. The male is larger than the female, and measures about 19 inches in length and 38 inches in extent.

Habitat.—North America from the Fur countries to Mexico.

*I have made diligent inquiry in relation to the Raven in the mountains of this and the adjoining county of Sullivan where they are comparatively common; they can be heard "croaking" at almost any time, but, owing to their shy and retiring habits, they are hard to get.—*McCrea.*

†Ravens breed regularly on high mountain ridges, in tops of tallest pine trees. In Elk county, on Dent's run, a branch of Benezett creek, which flows into the Susquehanna at Driftwood. In the last seven years I have received seven or eight Ravens from different parts of Centre, Elk and Lycoming counties.—*Eldon.*

The crow, readily recognized by its large size and glossy black plumage, is a common resident of Pennsylvania during all months of the year. This species ranges throughout different portions of North America, but is found chiefly in the eastern United States. In this locality the crow commences nest-building in the latter part of April; both sexes engage in this work which is completed in from three to five days. The nest, a very bulky structure, measuring about 20 inches in diameter and 10 inches in depth, is made up of sticks, twigs, bark, leaves, etc. It is built usually in an oak, chestnut or other tree, in an unfrequented woods; nests are sometimes placed in low trees or bushes in cedar thickets. The eggs vary greatly in size and color; four to six in number; length about 1.65 by 1.19 inches in width; light-greenish, spotted brown and black with purplish tints. The note of this well-known bird is a loud harsh *cāw*. During the early spring, fall and winter months this species is gregarious; flocks numbering from fifty to several hundred individuals are frequently observed scattered over the fields, meadows, along the highways, or in the woods searching for food. At night these birds resort in great numbers to favorite roosting-places, such as pine forests or cedar thickets. In the late spring and summer, crows are particularly destructive to young poultry, the eggs and young of small birds, and frequently nests of the domestic fowls, especially guineas and turkeys that often wander to a considerable distance from the farm house to lay, are also pillaged. These birds, as every farmer is well aware, commit more or less mischief in the cornfields.

Although the crow will rob the nest of any small bird which he can get at, the nests of the Robin, Wood Thrush, Catbird and Dove are the ones I have usually seen disturbed. The injury which the crow occasions by his egg-sucking, bird-devouring habit is, it is affirmed by eminent authorities, more than compensated for by the large numbers of noxious insects and mammals which he devours. Twelve of these birds taken in winter and examined by me had in their stomachs only vegetable materials, viz: Corn, oats, acorns, small seeds and berries. From such limited investigations I am unable to say whether the crow is a friend or an enemy to the farmer.

The following extract is taken from Prof. W. B. Barrow's report: *

SUMMARY OF EVIDENCE FROM ALL SOURCES.

It appears, therefore, from a careful consideration of all testimony, published and unpublished, that—

I. Crows seriously damage the corn crop, and injure other grain crops usually to a less extent.

II. They damage other farm crops to some extent, frequently doing much mischief.

III. They are very destructive to the eggs and young of domestic fowls.

IV. They do incalculable damage to the eggs and young of native birds.

* Annual report of the U. S. Dept. of Agri., 1888. Food of Crows, by Walter B. Barrows, S. B., Assistant Ornithologist.

V. They do much harm by the distribution of seeds of poison ivy, poison sumach, and perhaps other noxious plants.

VI. They do much harm by the destruction of beneficial insects.

On the other hand—

VII. They do much good by the destruction of injurious insects.

VIII. They are largely beneficial through their destruction of mice and other rodents.

IX. They are valuable occasionally as scavengers.

The careful examination of large numbers of stomachs, and the critical study of the insect food of the crow, may change materially the present aspect of the question; but so far as the facts at present known enable a judgment to be formed, the harm which crows do appears to far outweigh the good.

Corvus ossifragus Wilson.

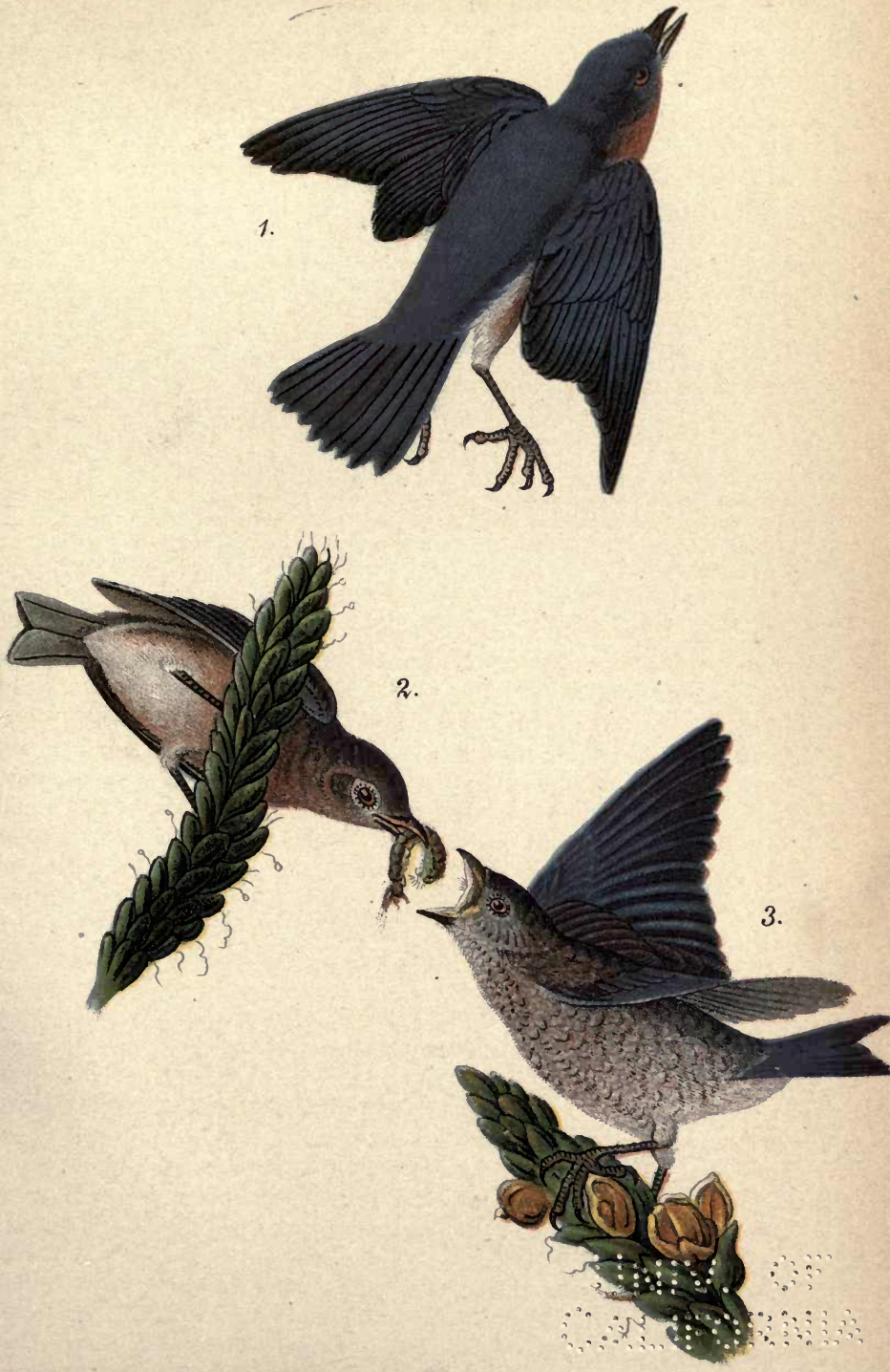
Fish Crow.

DESCRIPTION.

Smaller than *C. americanus*. Glossy black with green and violet reflections; the gloss of head, neck and belly greenish; a small space at base of lower mandible, on each side bare?; bill and feet black; iris brown. Length 14 to 16 inches; extent about 32 inches.

Habitat.—Atlantic coast, from Long Island to Florida.

The Fish Crow is a common and abundant resident, during all seasons, about the maritime districts of most and probably all of the southern states. According to Audubon they migrate northward in April and ascend the Delaware river in Pennsylvania, nearly to its source, but return to the south at the approach of cold weather. This bird is also found along the Susquehanna from Lancaster southward in the summer. Mr. J. Hoopes Matlack informs me that some few years ago he found the nest and eggs of this bird along the Brandywine creek, some two or three miles from the borough of West Chester. Mr. Gentry writing in 1877, says he has observed it during the past five or six years nesting along the water courses in the neighborhood of Philadelphia. This bird, like the preceding species, builds in trees. The nests and eggs of the Fish Crow, although smaller, cannot with absolute certainty be distinguished from those of the American Crow. The voice of the Fish Crow, according to Wilson, is very different from that of the Common Crow, being more hoarse and gutteral, uttered as if something had lodged in the throat. The common note of this bird, Audubon says, resembles the syllables *ha, ha, hae*, frequently repeated. In referring to the food of this species, Audubon writes substantially as follows: While searching for food, these birds hover at a moderate height over the water; but when they rise in the air, to amuse themselves, they often reach a great elevation. Like the Common Crow, the Fish Crow robs other birds of their eggs and young. They also prey upon the fiddler-crab, which they pursue and dig out of the muddy burrows into which they retire at the approach of danger. Small fry are easily secured with their claws as they fly close over the water's surface, from which they also pick up



Common Blue Bird.

1. Male; 2. Female; 3. Young.

any sort of garbage suited to their appetite; sometimes they pursue and attack the small terns and gulls, to force them to disgorge the small fish that they have captured. They are able to capture live fish with considerable dexterity, but cannot feed on the wing. During the winter and spring, the Fish Crows are very fond of feeding on many kinds of berries. As spring advances, and the early fruits ripen, the Fish Crows become fond of the mulberry, and select the choicest of the ripe figs, more especially when they are feeding their young. A dozen are often seen at a time, searching for the tree which has the best figs, and so troublesome do they become in the immediate vicinity of Charleston, that it is found necessary to station a man near a fig tree with a gun. They also eat pears, as well as various kinds of huckleberries.

FAMILY **ICTERIDÆ.** BLACKBIRDS, ORIOLES, ETC.

Nine species and one race of this family are found in Pennsylvania. With the exception of the Yellow-headed Blackbird, which occurs sometimes, it is said, in the western part of the state, straggling here from western North America, all of these birds are common; some reside with us during all months of the year; the Rusty Blackbird retires considerably north of this latitude to breed, but all the others rear their young within our limits. In the Cowbird and Bobolink the bill is short, stout and very similar to that of a sparrow's, but this organ in other birds of this family is rather long and slender. In the neighborhood of Lake Erie the Redwing is known to gunners as Reed-bird, and I have heard farmers who reside in the vicinity of Conneaut lake in Crawford county, and also others living about Lake Erie, say that these "Reed-birds" commit serious depredations in their cornfields in the latter part of summer and in the early fall.

GENUS **DOLICHONYX** SWAINSON.

Dolichonyx oryzivorus (LINN.)

Bobolink; Reed-bird.

DESCRIPTION (*Plate 26 male and female in spring*).

Bill short, stout, conical and much shorter than head; tail feathers sharp-pointed and stiff, quite like a woodpecker's; claws all very large; middle toe very long, measuring with claw 1.25 inches; bill dark, lighter at base of lower mandible; legs and feet (freshly killed specimens) brownish-yellow; iris brown. General color of male in spring and during breeding season (June and July) black; the nape brownish-cream color; a patch on the side of the breast, the scapulars and rump white, shading into light ash on the upper tail-coverts and the back below the interscapular region. In autumn similar to the female. In the early autumn males are often seen with black feathers (sometimes though seldom in patches) on the breast.

Female, yellowish beneath; two stripes on the top of the head, and the upper parts throughout, except the back of the neck and rump, and including all the wing feathers generally, dark-brown, all edged with brownish-yellow; which becomes whiter nearer the tips of the quills; the sides sparsely streaked with dark-brown, and a similar stripe behind the eye; there is a superciliary and a median band of yellow on the head.

Length of male about 7.25 inches; extent about 12.25 inches. Female averages a little smaller.

Habitat.—Eastern North America to the great plains; north to southern Canada; south in winter to the West Indies and South America. Breeds from the Middle States northward, and winters south of the United States.

Bobolinks are known by a variety of common names. The terms "Bobolink" and "Meadow Wink" are applied in imitation of its voice; the appellation "Skunk-blackbird," notes, as Dr. Coues remarks, the resemblance in color to the obnoxious quadruped. When the Bobolink has shed his showy dress of black, white and yellow, he frequents chiefly the reedy marshes of tide-rivers, and is known as "Reed-bird;" in the Carolinas, Georgia and elsewhere in the south, they congregate in great numbers on the rice-fields, where they are called "Rice-birds." In the West Indies these birds, from their excessive fatness, are known as "Butterbirds." "The name 'Ortolan,' applied by some gunners and restaurateurs to this bird, as well as to the Carolina Rail (*Porzana carolina*) is in either case a strange misnomer, the Ortolan being a fringilline bird of Europe, *Emberiza hortulana*, Linn."—*Coues.* Notwithstanding the fact that the Reed-bird is much larger than the English Sparrow, many game dealers are in the habit of "bunching" the two species and disposing of them as "Reed-birds." The Reed-bird, however, can easily be recognized by the pointed tail feathers, long legs and claws; the tail feathers of the sparrow are not pointed, and the legs and claws are short. Even when both birds are picked and their legs and heads cut off, the Reed-bird can mostly be distinguished by its plump, yellow and oily body; the carcass of a *fat* sparrow is never uniformly yellow, but is dark colored, with narrow streaks of yellow. The Bobolinks arrive in Pennsylvania, in flocks of from eight to twenty-five individuals, from May 5th to 20th. The males generally make their appearance about the fields, meadows and orchards several days in advance of the females; they also appear to proceed much more leisurely on their vernal migrations, than the females. Both sexes migrate chiefly at night when their "mellow metallic chink" may be heard both in spring and fall. The song of the Bobolink is a peculiar, rapid, jingling, indescribable medley of sounds, started first by one bird, quickly followed by another and another, until the whole flock are engaged, when, suddenly, without any apparent reason, they all, at the same instant, stop their vocal concert. When the male assumes the livery of the female he appears to lose his vocal powers, and is only heard to utter a sharp clinking note like that of the female. These birds, according to my experience, occur in southeastern Pennsylvania mainly as passing visitants * during the spring and fall when they are common. The nests

* Nests of this species, it is said, have on one or two occasions been found in Chester county, and young unable to fly have once been taken in Delaware county, Pa. From numerous reports received it appears that the Bobolink breeds more or less regularly in nearly all parts of the state, but as a summer bird it is far more numerous in counties of the western and northern parts of the state than elsewhere. The species is common in summer in parts of Erie, Crawford, Warren, Mercer, Bradford and Susquehanna counties.

and eggs are described by Dr. Coues as follows: "The Bobolink makes a rude and flimsy nest of dried grass on the ground, and lays four or five eggs, 0.85 long by about 0.63 broad, dull bluish-white, sometimes brownish-white, spotted and blotched with dark chocolate or blackish-brown surface marks, and others of paler hue in the shell. The nests are cunningly hidden, and often further screened from threatened observation by ingenious devices of the parents."—*(From Birds of Northwest.)* The food of these birds, during their spring sojourn in Pennsylvania is composed chiefly of different kinds of terrestrial insects, also the seeds of various weeds, grasses, etc. I have examined the stomach contents of twenty-seven Bobolinks (captured in Chester county, Pa., May, 1879, '80, '82 and '83), and found that eighteen had fed exclusively on beetles, larvæ, ants and a few earth-worms; five, in addition to insects and larvæ, showed small seeds, and particles of green vegetable materials, apparently leaves of plants; the four remaining birds revealed only small black and yellow colored seeds. After the breeding season the Reed-birds (both sexes), about the middle of August, again make their appearance in our meadows and grain fields. At this time, although various forms of insects are abundant, they subsist almost entirely on a vegetable diet. They visit the cornfields, and, in company with the English Sparrow, prey to a more or less extent on the corn; like the sparrow they tear open the tops of the husk and eat the milky grain. Fields of Hungarian grass are resorted to and the seed eagerly devoured. The different seeds of weeds and grasses which grow so luxuriantly in the marshy swamps and meadows are likewise fed upon with avidity.

The following interesting remarks, relative to the Rice-birds, are taken from the annual report of the Agricultural Department, for the year 1886, by Dr. C. Hart Merriam, ornithologist, United States Department of Agriculture, Washington, D. C.:

"One of the most important industries of the southern states, the cultivation of rice, is crippled and made precarious by the bi-annual attacks of birds. Many kinds of birds feed upon rice, but the bird which does the most injury than all the rest is the Bobolink (*Dolichonyx oryzivorus*). * * * The name of "Rice-bird" is familiar to most persons in the north, but the magnitude of its depredations is hardly known outside of the narrow belt of rice fields along the coasts of a few of the southern states. Innumerable hosts of these birds visit the fields at the time of planting in spring, devouring the seed-grain before the fields are flooded, and again at harvest-time in the fall, when, if maturing grain is 'in the milk,' they feed upon it to a ruinous extent. To prevent total destruction of the crop during the periods of bird invasion thousands of men and boys, called 'bird-minders,' are employed, hundreds of thousands of pounds of gunpowder are burned, and millions of birds are killed. Still the number of birds invading the rice fields each year

seems in no way diminished, and the aggregate annual loss they occasion is about $2,000,000."

Extracts from a letter from Capt. William Miles Hazzard, of Annandale, S. C., one of the largest rice-growers in the state.

"The Bobolinks make their appearance here during the latter part of April. At that season their plumage is white and black, and they sing merrily when at rest. Their flight is always at night. In the evening there are none. In the morning their appearance is heralded by the popping of whips and firing of musketry by the bird-minders in their efforts to keep the birds from pulling up the young rice. This warfare is kept up incessantly until about the 25th of May, when they suddenly disappear at night. Their next appearance is in a dark-yellow plumage, as the Rice-bird. There is no song at this time, but instead a chirp, which means ruin to any rice found in milk. My plantation record will show that for the past ten years, except when prevented by stormy south or southwest winds, the Rice-birds have come punctually on the night of the 21st of August, apparently coming from seaward. All night their chirp can be heard passing over our summer homes on South Island, which island is situated six miles to the east of our rice plantations, in full view of the ocean. Curious to say, we have never seen this flight during the day. During the nights of August 21, 22, 23 and 24, millions of these birds make their appearance and settle in the rice fields. From the 21st of August to the 25th of September our every effort is to save the crop. Men, boys and women are posted with guns and ammunition to every four or five acres, and shoot daily an average of about one quart of powder to the gun. This firing commences at first dawn of day and is kept up until sunset. After all this expense and trouble our loss of rice per acre seldom falls under five bushels, and if from any cause there is a check to the crop during the growth, which prevents the grain from being hard, but in milky condition, the destruction of such fields is complete, it not paying to cut and bring the rice out of the field. We have tried every plan to keep these pests off our crops at less expense and manual labor than we now incur, but have been unsuccessful. Our present mode is expensive, imperfect and thoroughly unsatisfactory, yet it is the best we can do. I consider these birds as destructive to rice as the caterpillar is to cotton, with this difference, that these Rice-birds never fail to come. If the government could devise some means to aid us in keeping off these birds it would render us great assistance. The loss by birds and the expense of minding them off in order to make anything, renders the cultivation of rice a dangerous speculation. During the bird season we employ about one hundred bird-minders, who shoot from three to five kegs of powder daily, of twenty-five pounds each; add to this shot and caps, and you will have some idea what these birds cost one planter."

Genus **MOLOTHRUS** Swainson.

Molothrus ater (Bodd.).

Cowbird; Cow Bunting; Cow Blackbird.

Description (*Plate 57*).

Bill short, stout, about two-thirds as long as head; tail nearly even or very slightly rounded; bill and feet black; iris brown.

Male with the head, neck and anterior half of breast deep brown, with slight purplish gloss; rest of body lustrous black, with a violet-purple gloss, next to the brown, of steel-blue on the back, and of green elsewhere.

Female.—Plain grayish-brown, lighter on the under parts.

Young.—Dull dusky-brown above, feathers edged with grayish, lower parts light brownish-gray more or less streaked or spotted with darker markings. In the late summer and early autumn the young male can often be distinguished by the conspicuous black patches on the body. The female is smaller than the male. An adult male measures about 8 inches in length and 13½ inches in extent.

Habitat.—United States, from the Atlantic to the Pacific, north into southern British America, south, in winter, into Mexico.

This well-known bird is a common summer resident in Pennsylvania. It arrives here late in March or early in April, and migrates southward about the middle of October. These polygamous birds, at all times, are gregarious. In the autumn these birds, frequently in company with the Crow Blackbirds and robins, collect in large flocks in thickets, where they roost during the night. When "coming in" to these roosting places the flocks of Cowbirds do not scatter and alight in the surrounding trees and bushes, as the Crow Blackbirds are accustomed to do, but they fly in a compact body directly to the thick bushy covert, where they remain, and unless disturbed are seldom heard to utter their harsh, rattling chuckle. The Cowbird builds no nest, nor does she attempt to rear her young; when desirous of laying, she quietly slips away from her companions, and finding a nest deposits her egg, and flies off to join her comrades feeding in the fields, or, perhaps, assembled in a tree-top. Although the Cowbird generally selects the nests of small birds, she never gains access to the same by force, but pays her visit when the owners are absent. Sometimes birds whose homes have been invaded by these feathered parasites abandon their nests, mostly, however (particularly if one or more of their own eggs have been deposited), they submit to the imposition and rear the young Cowbirds. The Yellow Warbler, occasionally, will build a new nest above that in which the unwelcome egg is deposited. I have twice found broken eggs of Cowbirds on the ground near nests of the Yellow-breasted Chat, and on three occasions have discovered the shattered remains of these eggs directly beneath the pendant nests of Baltimore Orioles. It may be that these two species, sometimes at least, toss out the alien eggs. While it is mostly observed that the Cowbird lays in the nests of birds much smaller than

herself, she also, at times, drops eggs in nests of larger species. Dr. Coues mentions among the Cowbird's larger foster-parents, the Wood Thrush, Yellow-breasted Chat, Kingbird and Towhee; on one occasion I saw two eggs in the nest of a Cardinal, and have twice seen eggs in nests of Wood Thrushes. Both nests of the species last named were, however, abandoned. From the fact that one Cowbird's egg is usually seen in a nest, I judge that this bird only deposits a single egg in a nest. I, of course, am well aware that sometimes two, three or more Cowbird eggs may be discovered in a single nest, yet this is no evidence that these eggs were deposited by one bird. The number of eggs which this bird lays is unknown; they are white, speckled or blotched with brown; vary greatly in size, but average, probably, about .88 in length and .65 in width. In addition to the species previously named, I have found Cowbirds' eggs or young in the charge of the following-named birds: Red and White-Eyed Vireos, Ovenbird, Maryland Yellow-throat, Scarlet Tanager, Song and Chipping Sparrows, Indigobird, Worm-eating Warbler, Acadian Flycatcher and Baltimore Oriole. This species frequents ploughed fields, woods and pasture grounds, mingles freely among cattle and may often be observed perched on their backs. The food of these birds consists of seeds, grains, berries and insects. Although Cowbirds subsist to a small extent on wheat and rye, they never, I think, like the English Sparrow, attack these cereals when growing. The seeds of clover, timothy, fox-tailed grass, bitter-weed, etc., are included in their bill of fare; blackberries, huckleberries, cedarberries, wild cherries and the summer grape (*Vitis æstivalis, Mz.*) are eaten. They subsist to a very great extent, however, on insects; large numbers of grasshoppers, beetles, grubs and "worms" are eagerly devoured.

Genus **AGELAIUS** Vieillot.

Agelaius phœniceus (Linn.).

Red-winged Blackbird; Swamp Blackbird.

Description (*Plate 27*).

Bill, legs and feet (dried specimens) black; iris brown; male larger than female.

Adult male.—Uniform lustrous black; shoulders and lesser wing-coverts scarlet, bordered with brownish-yellow.

Adult female.—Above dusky-brown, streaked with lighter and darker shades; below whitish streaked with brown; throat, chin, edge of wing, tinged with pink or yellowish, but mostly pink, in the spring and summer at least. The female differs greatly in appearance; the prevailing color above is brownish-black, all the feathers margined with reddish-brown; some of those on the back with brownish-yellow, which, on the median and greater wing-coverts, form two bands; the under parts are dull-whitish, each feather broadly streaked centrally with dark-brown; the chin and throat yellowish, and but little streaked; there is a distinct whitish superciliary streak along side the head, tinged anteriorly with brownish-yellow, and another less distinct in the median line of the crown. The young male, at first very similar to

Loon.

1. Young in Winter; 2. Adult.

the female, may soon be recognized by the black feathers appearing singly or in patches; immature males exhibit every possible condition of coloration between that of the old female and of the adult male.

Male measures about 9½ inches in length and 15.25 inches in extent.

Habitat.—North America in general, from Great Slave Lake south to Costa Rica.

The Swamp or Red-winged Blackbird, as this well-known species is usually designated, is a common summer resident in Pennsylvania. Arrives in small flocks about March 20; males come a few days in advance of females; both sexes in company leave during the latter part of September. These birds, mainly terrestial when feeding, frequent principally meadows, fields and swamps. Nests, built early in May and also in July (two broods being sometimes raised in this locality), are placed in tussocks of grass or in low bushes, preferably along the borders of streams or ponds. Nest, bulky, composed chiefly of coarse grasses, lined with finer grass; those built on bushes are mostly very compact, others are generally loose and carelessly constructed. The eggs, four to six, a little less than an inch long, and not quite three-fourths of an inch broad, are light-bluish, spotted, blotched and lined with black and purplish-brown. Sometimes several females, with only one male will be found breeding in a swamp or field, at other times the male appears to devote his exclusive attention to one female. A dozen or more nests may frequently be seen in close proximity to each other, and their owners always appear on friendly terms; when these nesting-places are approached the Red-wings hover over your head and utter sharp piteous cries.

Although Swamp Blackbirds sometimes visit cornfields during the planting season, and also again when the corn is in the milky state, the amount of grain which they take or injure is so small that the farmer is seldom heard to utter a complaint against them.

The following twenty odd records will suffice to show the general nature of the food during the months of March, April and May:

No.	Date.	Locality.	Food-Materials.
1	March 8, 1880,	Chester county, Pa.,	Beetles.
2	March 18, 1882,	Chester county, Pa.,	Beetles.
3	March 18, 1882,	Chester county, Pa.,	Small seeds. [ter.
4	March 18, 1882,	Chester county, Pa.,	Beetles and small amount of undetermined vegetable mat-
5	March 18, 1882,	Chester county, Pa.,	Grubs and few seeds.
6	March 18, 1882,	Chester county, Pa.,	Beetles and particles of Indian corn.
7	March 31, 1883,	Chester county, Pa.,	Small black-colored seeds.
8	March 31, 1883,	Chester county, Pa.,	Grass seeds.
9	April 12, 1883,	Chester county, Pa.,	Small seeds and insects.
10	April 14, 1883,	Chester county, Pa.,	Small seeds and beetles.
11	April 14, 1883,	Chester county, Pa.,	Small seeds and beetles.
12	April 14, 1883,	Chester county, Pa.,	Beetles chiefly; some few small seeds. [matter.
13	April 14, 1883,	Chester county, Pa.,	Beetles chiefly and small amount undetermined vegetable
14	May 3, 1880,	Chester county, Pa.,	Insects, with apparently few blades of grass (?).
15	May 20, 1883,	Chester county, Pa.,	Beetles and grubs.
16	May 20, 1883,	Chester county, Pa.,	Corn "cut worms."
17	May 20, 1883,	Chester county, Pa.,	Beetles and other insects.
18	May 20, 1883,	Chester county, Pa.,	Beetles and other insects.
19	May 20, 1883,	Chester county, Pa.,	Beetles and "cut worms."
20	May 20, 1883,	Chester county, Pa.,	Brown-colored seeds.
21	May 28, 1883,	Chester county, Pa.,	Cut worms and beetles.
22	May 28, 1883,	Chester county, Pa.,	Black-colored seeds.
23	May 28, 1883,	Chester county, Pa.,	Beetles and few small seeds.
24	May 28, 1883,	Chester county, Pa.,	Chiefly "cut worms" and traces of beetles.
25	May 3, 1884,	Chester county, Pa.,	Purple-colored flies.

The Red-wing, like the Crow Blackbird, destroys large numbers of "cut-worms." I have taken from the stomach of a single Swamp Blackbird as many as twenty-eight "cut-worms." In addition to the insects, etc., mentioned above, these birds also, during their residence with us, feed on earth-worms, grasshoppers, crickets, plant-lice and various larvæ, so destructive at times in the field and garden. During the summer season, fruits of the blackberry, raspberry, wild strawberry, and wild cherry are eaten to a more or less extent. The young, while under parental care, are fed exclusively on an insect diet.

Dr. Coues, writing of this species, says: "From its general dispersion in low or wet thickets or fields, swamps and marshes, the blackbird collects in August and September in immense flocks, thronging the extensive tracts of wild oats and other aquatic plants in marshes and along water-courses, also visiting and doing much damage to grain-fields. Thousands are destroyed by boys and pot-hunters, but the hosts scarcely diminish, and every known artifice fails to protect the crops from invasion of the dusky hordes. At other seasons the 'maize-thief' is innocuous, if not positively beneficial, as it destroys its share of insects."—*Key, p. 404.* In the rice-growing states the Red-winged Blackbird ranks next to the Reed-bird in its ravages on the rice fields. *Theo. S. Wilkinson, Myrtlegrove plantation, lower coast, Louisiana,* writes as follows in the annual report (1886), issued by Ornithologist Dr. C. Hart Merriam, U. S. Dept. of Agr., Washington, D. C.: "The rice crop in Louisiana, from the time the rice is in the milk till harvest time and during harvesting, is much damaged by birds, principally the Red-shouldered Blackbird. Shooting is the only remedy thus far resorted to which is at all effective, and it is only partially so. I have known rice crops to be destroyed to the extent of over 50 per cent., which is a loss of say $13 per acre. While this is an extreme case, a damage and expense of from $5 to $10 per acre is very common.

"The average yield per acre is about 30 bushels, worth now (March 12, 1886) about 80 cents per bushel."

Genus **XANTHOCEPHALUS** Bonaparte.

Xanthocephalus xanthocephalus (Bonap.).

Yellow-headed Blackbird.

Description.

Bill conical and about twice as long as high; wings longer than tail; first primary longest.

Male.—General color black, including lores, and some feathers about eyes and lower bill; rest of head, the neck and breast, also few feathers about vent yellow; showy white patch on wing. The female is smaller, and dark brown; top of head brown; line over eye, throat and breast dull yellow; no white wing patch. Length, male about 10½; extent about 16½; bill and legs (dried skin) blackish.

Habitat.—Western North America, from Wisconsin, Illinois and Texas to the Pacific coast. Accidental in the Atlantic states (Mass., S. C., Penna., Fla.).

I have never met with the Yellow-headed Blackbird in Pennsylvania, where it occurs only as an accidental visitor.

"Dr. Jackson mentions that this species is occasionally seen along the Allegheny mountains, where a flock appeared in the autumn of 1857. Mr. John Krider shot a young male near Philadelphia."—*Turnbull.*

In a letter dated April 6, 1890, Mr. H. C. Kirkpatrick, of Meadville, Crawford county, writes as follows concerning this bird: "I had the good fortune to get a fine pair of Yellow-headed Blackbirds on March 25, 1890, the first I have ever observed around here."

GENUS **STURNELLA** VIEILLOT.

Sturnella magna (LINN.).

Meadowlark.

DESCRIPTION (*Plate 28*).

Thick and stout body; legs large; toes reach beyond the tail; hind toe long, its claw twice as long as middle one; upper mandible (dried specimens) dark brown; lower bill lighter at base, dark towards the point; tarsus and feet light brownish; claws darker; iris brown. Feathers of head stiffish, tipped with bristles. Throat, sides of breast, spot from nostrils to eye, edge of wing and abdomen bright yellow; breast with a large black crescent, the horns of which go half-way up side of neck; the feathers above dark brown; exposed portions of wings and tail with transverse dark-brown bars, which on the middle tail feathers are confluent along the shaft; strong shade of bluish-ash on lesser wing-coverts; several lateral tail feathers partly white; sides, under tail-coverts and tibiæ pale reddish-brown, streaked with blackish; a light stripe extends from base of upper mandible over crown; and similar ones over along sides of top of head; a faint black streak above the eye, and a broad one behind it. Sexes alike but female usually duller than male. Birds in the autumn have black breast spot more or less obscured with grayish or brownish. Southern birds are smaller than northern. Male, length about 10½ inches; extent about 16½ inches. The female is smaller.

Habitat.—Eastern United States and southern Canada to the plains.

The Meadowlark occurs in Pennsylvania during all months of the year, but in the spring, summer, and particularly in the autumn, is much more common than throughout the dreary months of winter. These birds are gregarious, at least they generally, when not engaged in breeding, are to be found in small flocks, which wander about from place to place, and only discontinue this nomadic life when they engage in housekeeping. These well known rovers, rendered so conspicuous by their yellow shirts and black bosoms, collect usually in parties of from twelve to thirty each; in the fall, however, it is not uncommon to find a hundred, and sometimes more, of these birds scattered about a field or meadow. Meadowlarks—generally quite shy and difficult of approach—frequent at all seasons, principally grassy fields and meadows, but during the winter when deep snows cover their common feeding grounds,

they often visit the barnyards, and, if not molested, will become rather tame. They also, at these periods of snow inundation, assemble in the public highways and glean a scanty subsistence from the droppings of horses. Although larks frequently alight on trees, they never, I think, are seen to feed in such places, their food is collected from the ground. In spring the flocks break up and these birds are observed singly or in pairs. Nest building, in this latitude, is begun late in April or early in May. Both sexes engage in constructing their nest, composed of dried grasses, placed on the ground, and most ingeniously concealed in a thick tuft of grass. The nests are built in meadows and grass fields, and frequently, though not always, rest in a concavity of the earth.

The oval white eggs, usually five in number, are spotted with reddish-brown; they vary considerably in size, but average about 1.16 inches long by .80 of an inch wide. Their food consists of various forms of insects, among which may be mentioned beetles, grasshoppers, larvæ, earth-worms, ants, etc. The lark, like the Red-winged Blackbird, is fond of "cut-worms," he also subsists on the seeds of various grasses, weeds, etc., and, according to Mr. Gentry, they sometimes feed on wild cherries, wild strawberries and blackberries. Although this species will sometimes eat the grains of wheat, oats, rye or particles of corn which they find scattered on the ground in fields or other places, they rarely disturb these cereals when growing, and never commit, in grain fields, any depredations at or about the season of harvest. Seventeen Meadow-larks, which I captured (March and April, 1885), in the open pine woods of Florida, were found to have fed only on insects, chiefly beetles. In December, 1886, I killed seven of these birds in Chester county, Pa., their stomachs were all gorged with grasshoppers. In the Carolinas, Audubon says, many planters agree in denouncing the lark as a depredator, "alleging that it scratches up oat seeds, when sown early in spring, and is fond of plucking up the young corn, wheat, rye or rice."

Genus ICTERUS Brisson.

Icterus spurius (Linn.).

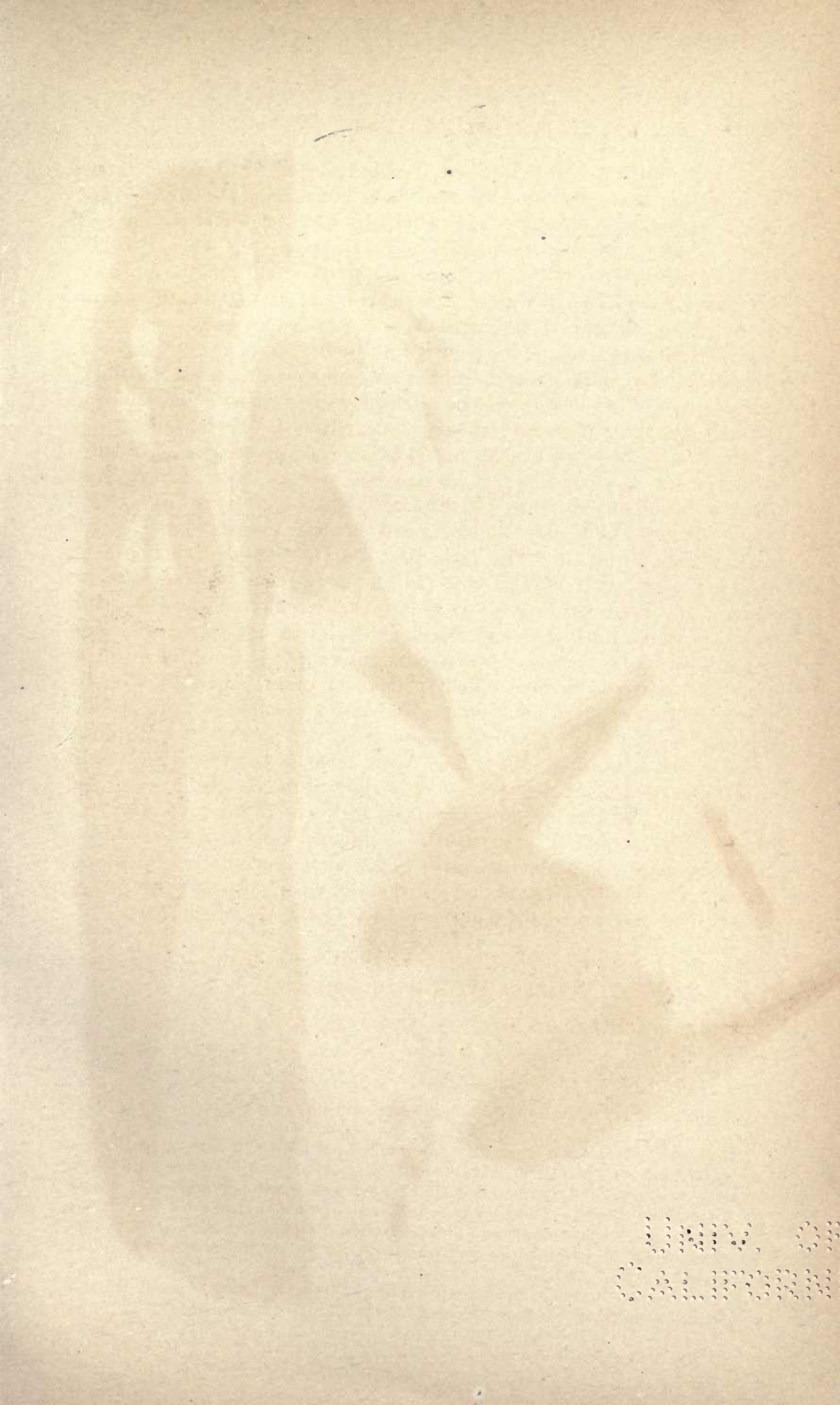
Orchard Oriole.

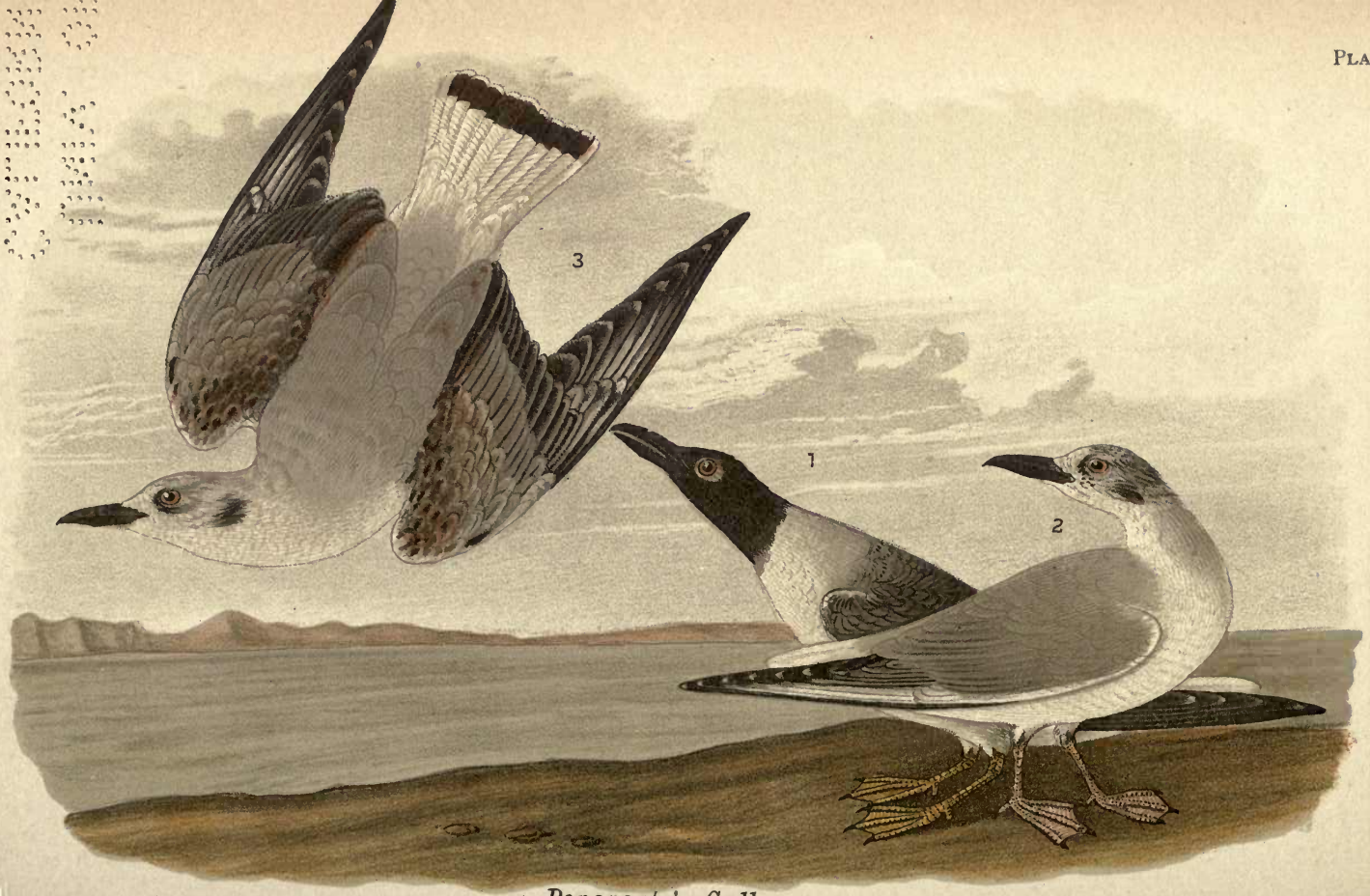
Description (*Plate 75*).

Bill slender, very acute and somewhat decurved; bill and feet bluish-black; iris brown.

Adult male.—Head and neck all round, upper portion of breast and back, scapulars, tail and wings (except middle and lesser coverts, which are chestnut) deep black with slight gloss, particularly about head and throat; lateral tail feathers with white tips Rest of under parts, lower part of back, upper tail-coverts dark chestnut brown, deepest on breast; greater wing-coverts black, edged with white, forming a wing-bar: secondaries and sometimes primaries, edged with whitish or pale chestnut.

Adult female.—Above yellowish olive, darkest on back, clearest on head, tail and rump; below light olive-yellow; wings dusky, with two bars of white.





Bonaparte's Gull.

1. Male. Spring. 2, 3. Female and Young. Fall.

Young male.—In late summer and autumn, similar to female, though somewhat larger. I have never seen young males in spring without *some* black feathers on throat or loral space, or *some* chestnut-colored feathers, and I have taken young males when just able to fly with a few black feathers on chin and throat.

Young male in spring.—Similar to female, but with face and throat black. From this last described condition males are found in all stages until the full adult plumage is assumed. The chestnut and black appears in streaks and patches. A young male (*nine months old*) now before me, is in full adult plumage, with the following exceptions: Occiput and crown with a few dark yellowish feathers; feathers of lower hind neck and inter-scapular region deep black but edged with rusty; a few yellow feathers mixed with the light chestnut of abdomen; sides slightly tinged with yellowish which is generally on tips of chestnut feathers; edge of wing yellow and chestnut; middle coverts of one wing margined with greenish-yellow, on the other wing these feathers same as in adult; greater coverts (both wings) edged with pale chestnut. Length about 7 inches; extent about 10 inches: female trifle smaller.

Habitat.—United States, west to the plains, south in winter in Panama.

The Orchard Oriole, as its vernacular name would indicate, is a common inhabitant of orchards, particulary apple orchards.

Late in April or early in May, usually a few days after the shrill notes of the Baltimore Oriole have been heard, the subject of this present sketch arrives from his winter retreats in tropical America. This species appears to arrive singly or in pairs, the males come at least two or three days before the females. The Orchard Oriole is of a rather shy disposition, and although he is a common frequenter of the fruit and shade trees, both in town and country, he prefers to shelter his body in the thickest portion of the leafy branches, from which his peculiar—somewhat harsh and rattling though not unmusical—notes are frequently heard when the vivacious little minstrel is entirely hidden from view. Sometimes, however, he will, like the Indigo-bird or Brown Thrush, perch on the topmost limbs and sing with the greatest energy. As soon as the young are hatched his rapid and confused song ceases. The firm and somewhat long cup-shaped nest, constructed of fine green grass stems most beautifully interwoven and lined on the bottom with downy substances, is usually placed among the upright twigs of an apple, pear or maple limb. When such a site is selected the nest is not pensile; on two occasions, however, I have found nests which were suspended from small bifurcated branches. The nests, before the eggs are hatched, have an odor similar to that of new hay. The eggs, mostly five, are bluish-white, indistinctly dotted with bluish-gray, and conspicuously spotted (sometimes lined) with brown and black. They measure about .86 by .58. In the late summer, preparatory to migrating south, these birds collect in flocks* of from fifteen to thirty, seldom more, and are frequently to be seen flitting through the bushes and trees along the roadside or about the borders of woods and clearings.

The food of this species consists chiefly of insects. They destroy great quantities of caterpillars, as well as other destructive larvæ. Immense numbers of noxious beetles, numerous plant-lice, many spiders and flies

* These flocks, I think, are composed entirely of young of the first year.

are captured during their foraging expeditions in the orchard, field and garden. "Rose-slugs," "cabbage-worms" and grasshoppers are eagerly devoured by Orchard Orioles. They subsist to a small extent on soft fruits (strawberries, mulberries and raspberries) when the same are in season, and occasionally feed on apple and pear blossoms, their depredations, however, in these directions are very unimportant.

The food-materials of sixteen Orchard Orioles examined by the author are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	May 11, 1880, . . .	Berwyn, Pa.	Small green "worms," on apple tree.
2	May 15, 1880, . . .	Chester county, Pa., . . .	Small "worms" and beetles.
3	May 15, 1880, . . .	Chester county, Pa., . . .	Beetles.
4	May 17, 1880, . . .	Chester county, Pa., . . .	Vegetable matter (not determined).
5	May 23, 1880, . . .	Chester county, Pa., . . .	Caterpillar, beetles and flies.
6	May 6, 1881, . . .	Chester county, Pa., . . .	Beetles and few small seeds.
7	May 8, 1883, . . .	Chester county, Pa., . . .	Caterpillars and beetles.
8	May 13, 1883, . . .	Chester county, Pa., . . .	Small green worms and beetles, on apple trees.
9	May 17, 1883, . . .	Chester county, Pa., . . .	Beetles and larvæ.
10	May 17, 1883, . . .	Chester county, Pa., . . .	Numerous small green-colored beetles.
11	May 21, 1883, . . .	Chester county, Pa., . . .	Caterpillar, beetles and some little vegetable matter.
12	June 10, 1880, . . .	Newark, Delaware, . .	Beetles and flies.
13	June 1, 1883, . . .	Chester county, Pa., . . .	Caterpillar and vegetable matter.
14	June 4, 1884, . . .	Chester county, Pa., . . .	Small worms and beetles.
15	June 7, 1884, . . .	Chester county, Pa., . . .	Caterpillars, small green beetles and other insects.
16	July 20, 1884, . . .	Chester county, Pa., . . .	Small seeds and flies.

Icterus galbula (Linn.).

Baltimore Oriole; Hanging-bird.

Description (*Plate 29*).

The adults and young vary greatly in plumage. The adult female and young male frequently can only be distinguished by dissection. Length about 8 inches; extent about 12½ inches; female smaller.

Habitat.—Eastern United States; west nearly to the Rocky mountains.

The Baltimore Oriole is quite plentifully distributed throughout Pennsylvania as a summer resident. This well-known and beautiful species winters, it is stated, in Cuba, Mexico and Central America, and in the spring migrates northward, arriving in this latitude from April 25 to May 1. The males come mostly a few days in advance of the females, and appear usually in parties of five or eight, sometimes, though rarely, flocks of fifteen or twenty individuals are observed. These birds at first, and particularly if several should be together, are generally found frequenting forests; especially do they delight in gleaning among the branches of the hickory, maple and oak trees. The Baltimore Oriole, like the preceding species, is a common frequenter about the habitations of man. This bird is known by a variety of names, most of which have reference to his showy dress. The appellation "Baltimore," Dr. Coues writes, "is not from the city of that name, but from the title of Sir George Calvert, first baron of Baltimore; the colors of the bird being chosen for his livery, or resembling those of his coat-of-arms."—*Key to N. A. Birds, p. 408.* The terms Golden-robin, Fire-bird and Red-bird,

Least Tern.

1. Adult; 2. Young. Fall.

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are in allusion to the orange coloration, brightest on the breast, but varying in amount as well as brilliancy with age and season. He is also called Hang-nest and Hanging-bird, from the fact that he, assisted by his mate, constructs a most elaborate pensile nest, so frequently seen swinging in the pendant branches of the drooping willow, the spreading elm, the stately poplar or the tall sycamore. Nest building, in this locality, is begun late in May or early in June. The male devotes himself, principally, to collecting the building materials, while upon the female, Mr. Gentry states, "devolves the duty of weaving the ingredients together, which is the labor of a week of almost steady application." The nest, composed of various materials,* such as strings, pieces of lint, rags, plant-fibers, hair, etc., which are capable of being woven together, is always suspended from the pendulous branches of a tree either in an orchard, lawn or woods. The bottom of this swaying, cylindric and pouch-like abode is lined with different downy substances. The nests are generally so placed that they are sheltered by a bunch of leaves hanging from above, sometimes, however, when insufficient protection is thus furnished by nature, these weaver-birds, to shield their hidden treasures from sun and rain, will construct a canopy of strings, etc., above the top of their house. The eggs, commonly five in number, are a little larger than those of the Orchard Oriole. They are whitish, dotted, blotched, spotted and sinuously lined with black and brown. The Baltimore Oriole feeds chiefly on various forms of insect-life. The destructive apple-tree caterpillars, as well as other caterpillars, are destroyed in great quantities by these birds, who not only subsist to a considerable extent on these and other larvæ, but likewise, Nuttall states, feed their young principally on soft caterpillars. The orioles also capture large numbers of beetles, flies, spiders, etc., in the fruit and forest trees. They occasionally feed on the blossoms of the apple, pear, maple and other trees. A juicy cherry is relished, and different kinds of small berries are fed upon to a more or less extent. Mr. Gentry in relation to this species says: "This oriole deserves our favor and esteem for the numerous insects of an injurious character which it destroys, which thus compensate for the trifling injuries which it commits in the destruction of the succulent pea and the blossoms of the cherry and apple which it rifles of their stamens and ovaries."

To Prof. A. Wanner, of York, Pa., I am indebted for the following interesting note concerning this species: "Several years ago I observed some Baltimore Orioles in my yard opening the rough (on the exterior) almond-shaped cocoons that hung from the limbs of fruit trees. The birds systematically hunted limb after limb in quest of the cocoons,

* The following interesting extract is taken from a letter sent to the author by Dr. John W. Detwiller, of Northampton county: "The late Dr. H. Detwiller, of Easton, Penna., had a female Baltimore Oriole in confinement for several years. It became so tame that it had the liberty to fly about the house as it pleased; it built a nest from the Doctor's gray hair which it would pull from his head. This remarkable piece of bird architecture is now in the possession of Mr. Minnot, of Germantown, Pennsylvania."

and as soon as they were found the orioles opened them and took out the larvæ at the rate of two in a minute. I watched the birds and timed them."

The food materials of twenty-six of these birds examined by the author and Mr. Benj. M. Everhart are given below:

No.	Date.	Locality.	Food-Materials.
1	May 4, 1880,	Chester county, Pa.,	Beetles and blossoms.
2	May 10, 1880,	Chester county, Pa.,	Beetles and diptera.
3	May 6, 1880.	Chester county, Pa.,	Vegetable matter, apparently blossoms.
4	May 6, 1880.	Chester county, Pa.,	Beetles and vegetable matter.
5	May 10, 1880.	Chester county, Pa.,	Beetles and vegetable matter.
6	May 11, 1880.	Chester county, Pa.,	Caterpillars, fragments of beetles, small green worms and leaves.
7	June 6, 1880,	New Castle co., Del.,	Beetles.
8	June 11, 1880,	New Castle co., Del.,	Beetles and vegetable matter (blossoms).
9	May 19, 1882,	Chester county, Pa.,	Larvæ, diptera and beetles.*
10	May 19, 1882,	Chester county, Pa.,	Larvæ, diptera and beetles.*
11	May 19, 1882.	Chester county, Pa.,	Beetles and flies.*
12	May 19, 1882,	Chester county, Pa.,	Beetles and flies.*
13	May 7, 1883,	Chester county, Pa.,	Larvæ and beetles (on apple tree).
14	May 7, 1883,	Chester county, Pa.,	Beetles and diptera.*
15	May 7, 1883,	Chester county, Pa.,	Beetles and diptera.*
16	May 7, 1883,	Chester county, Pa.,	Black beetles.*
17	May 13, 1883,	Chester county, Pa.,	Small black beetles (on apple tree).
18	May 13, 1883,	Chester county, Pa.,	Small black beetles (on apple tree).
19	May 14, 1883,	Chester county, Pa.,	Larvæ, beetles and traces of vegetable matter.*
20	May 14, 1883,	Chester county, Pa.,	Larvæ.*
21	May 14, 1883,	Chester county, Pa.,	Beetles.*
22	May 14, 1883,	Chester county, Pa.,	Larvæ and beetles.*
23	May 21, 1883,	Chester county, Pa.,	Larvæ.
24	May 21 1883,	Chester county, Pa.,	Larvæ.
25	May 25, 1883,	Chester county, Pa.,	Beetles and larvæ.
26	June 1, 1883,	Chester county, Pa.,	Beetles and larvæ.

Genus SCOLECOPHAGUS Swainson.

Scolecophagus carolinus (Müll.).

Rusty Blackbird.

Description.

Bill shorter than head and rather slender; legs and feet dark; iris pale-straw color; light line over eye.

Male.—General color black and somewhat glossy; feathers of upper part very rusty; lower parts rusty but lighter.

Female.—Brownish-slate color, more or less rusty. Length about 9½ inches; extent about 15 inches; female little smaller.

Habitat.—Eastern North America, west to Alaska and the plains. Breeds from northern New England northward.

The Rusty Grackle, the only blackbird occurring regularly in Pennsylvania which does not breed here, can readily be recognized from other species by its ferruginous plumage and yellow or light-colored eyes. The Rusty Blackbirds winter in the southern states, passing southward as far as Florida, where I have observed them in February and March. When journeying to their breeding grounds, from the northern New England states to Labrador, etc., this species, according to my observation, migrates singly or in pairs, but never in flocks. These birds arrive in Pennsylvania, occasionally, as early as March 1,

* Feeding in hickory trees.

and some seasons they are not observed before April 1; they usually, however, come about the middle of March, and frequent chiefly, during their brief sojourn, bushy and marshy situations generally. After having reared their young they again make their appearance in this state about the middle of October (sometimes as early as the first of October), and often are seen as late as the 20th of November. In the autumn the Rusty Blackbirds are observed in flocks of from eight to a dozen or fifteen, seldom more. At this time they inhabit the same localities that were resorted to in spring, and visit also corn and other grain fields; like the Cowbirds, that depart usually by the time their rusty-coated relatives arrive, they often frequent pasture grounds among the cattle. I have never seen these birds alight on the backs of cattle as Crows and Cowbirds sometimes are in the habit of doing. The only note I have ever heard this bird utter is a short and rather low *chuck*. The food of this species consists largely of beetles, grasshoppers, snails and earth-worms. They feed to considerable extent on the seeds of various plants; different kinds of small berries are added to their *ménu;* the scattered grains of wheat, rye or other cereals, which are to be found in the fields and meadows, are likewise eaten. When in cornfields they sometimes perch on the shocks and pick from the ears a few grains, the damage, however, which they do in this way is of but little importance.

Genus **QUISCALUS** Vieillot.

Quiscalus quiscula (Linn.).

Purple Grackle; Common Crow Blackbird.

Description (*Plate 61. Fig. 1.*)

Bill stout, about as long as head; bill and feet black; iris yellow. In life may be recognized by the V-shaped tail, so conspicuous when flying. Head and neck all well defined steel-blue, the rest of the body with varied reflections of bronze, golden, green, copper and purple, the latter most conspicuous, especially on tail, the tail-coverts and wings.

Female.—Similar, but smaller and duller, with more green on the head.

Young.—Very similar to female. The eyes of young birds are brown.

Male.—Measures about 13 inches long and 18 inches in extent.

Habitat.—Atlantic states, from Florida to Long Island.

It can safely be said that of the numerous representatives of the Avian tribes abounding throughout this great commonwealth, no species is more abundant or familiarly known than is the subject of this article. Early in the month of March this species arrives in Pennsylvania in large-sized flocks from their wintering resorts, viz: Virginia, the Carolinas, Georgia and other of the southern states.

During mild winters, however, I have frequently observed them, in limited numbers, in this section (Chester county), also in the county of

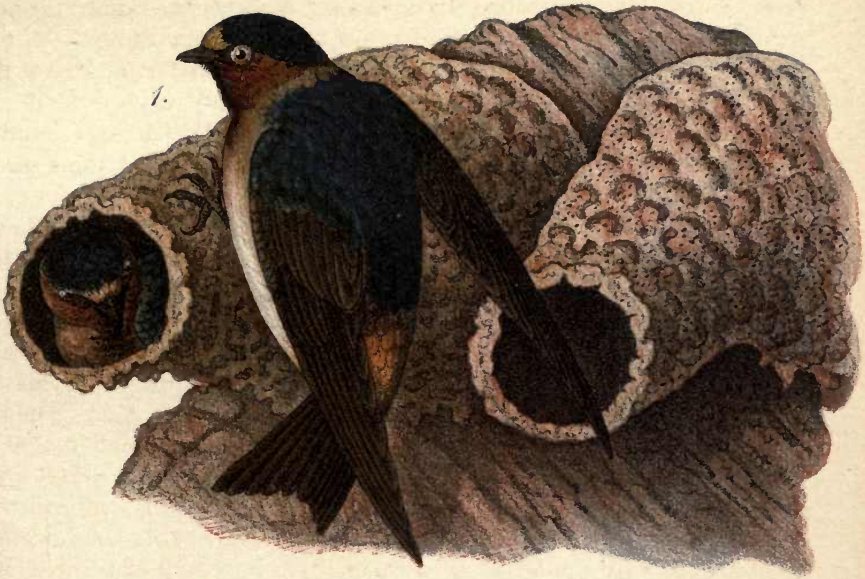
New Castle, Delaware; correctly speaking, however, we cannot properly regard these birds as winter residents of the Keystone State.

For a period of about one month following their vernal arrival they roam over the country, frequenting chiefly meadows, low lands and plowed fields. On the approach of night they collect in large numbers in some favorite roosting place, such as cedar or pine trees, thick woods, or dense thickets.

Nest-building is usually begun about the middle of April, although on two or three occasions I have found nests, with full complements of eggs, as early as the first week in April.

In colonies of from ten to twenty, seldom more, they locate themselves for the purpose of nidification and reproduction. In this locality (Chester county) their favorite breeding resorts are apple orchards, the fruit and other trees commonly about the habitations of man. The nest is bulky and rudely constructed externally of rootlets, small twigs, dry plants, bits of corn-blades, etc., somewhat loosely but quite firmly bound together. Mud or mudded materials frequently enter into the construction of the nest, but this is not always the case; the interior is lined usually with fine grasses; occasionally I have seen leaves and feathers constituting the internal lamina. The construction of the nest occupies about one week; both sexes engage in its erection. It is built at the junction of two or more large-sized limbs or among the sprouts and matted twigs. The nests vary somewhat in size, but the one now before me—about the average—gives the following dimensions: Height, $6\frac{1}{2}$ inches; diameter, $7\frac{7}{8}$ inches; depth of cavity, 3 inches. Gentry observes that the female begins to deposit her eggs, one *ovum* per day, the day following the completion of the nest. Such may be the case, but my observation has been that oviposition does not often take place until three or even five days subsequent to the completion of the nest. The complement of eggs is commonly spoken of as six; generally, however, I have found five, and regard this number as the full quota. The eggs are light greenish (sometimes pale rusty-brown), spotted, blotched and lined with black and dark-brown; they measure about $1\frac{1}{4}$ inches long and .90 of an inch wide. The period of incubation is from fourteen to fifteen days. The parent birds evince marked solicitude for their nest and its contents.

It is evident from the writings of various authorities that the nesting sites of this species vary considerably. By Nuttall and others we are informed that they sometimes build in bushes. From the works of Audubon it is learned that in the south they build chiefly in hollow trees. I have found these birds building in common house ivy (*Hedera helix*) but never in bushes, and only on two occasions have I discovered their nests in hollow trees; both of these nests were built in apple trees. One was constructed in a limb about seven feet from the ground, the



1. Cliff Swallow. *2. Barn Swallows.*

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other was placed about twenty feet from the earth, neither of these differed materially in their make-up from the average nest.

Food.

To our agriculturist this is a subject worthy of some consideration. It appears to be the prevailing opinion among many farmers—the majority in fact—that Crow Blackbirds are in many ways detrimental, and in no particular are they beneficial. This belief, evidently handed down from one generation to another, is taken in its full meaning, widely at variance with positive fact. Among the first of our vernal migrants come the Crow Blackbirds in large flocks which disperse themselves over the country, frequenting, principally, as previously stated, meadow lands and humid grounds in quest chiefly of an insect diet, that is only occasionally diversified by a grain of corn, wheat or oats, and such seeds as may be found in seeking the hidden insect.

In the wake of the plowman, as he turns the crumbling earth, closely follow the argus-eyed Grackles, ever on the alert to seize the wriggling worm, the agile beetle, or the glistening grub, and the numerous *larvæ* thrown out as each furrow is turned. Certainly, at this season our sable acquaintances are engaged only in that which will prove of utility to the cultivator when his crops are growing. We repeatedly hear of how the blackbirds tear up and devour the young and growing corn. This, unquestionably, is sometimes the case, but I am confident that the destruction thus done is much exaggerated. I am aware that on more than one occasion I have seen the tender blades of corn lying on the ground where were actively at work Crow Blackbirds, a number of which were shot, and on post-mortem dissection their stomachs revealed almost entirely insects. Some six years ago I was visiting a friend who had thirty odd acres of corn (maize) planted. Quite a number of "blackies," as he styled them, were plying themselves with great activity about the growing cereal. We shot thirty-one of these birds feeding in the cornfield. Of this number nineteen showed only *cut-worms* in their stomachs. The number of cut-worms in each, of course, varied, but as many as twenty-two were taken from one stomach. In seven some corn was found, in connection with a very large excess of insects, to wit: Beetles, earthworms and cut-worms. The remaining five showed chiefly beetles.

Comment is frequently made with regard to the Purple Grackles pillaging the cherry trees. To some extent this is true, but certainly the amount of fruit taken is small, far less than that injured by the well-known Cedar or Cherry Bird (*Ampelis cedrorum*).

Strawberries, blackberries and other fruits are fed upon, but to a very limited extent, by this species. The diet of the young birds, while under parental care, is almost exclusively insectivorous, consisting mainly of caterpillars and grubs.

It is a well-established fact that they are given to pillaging the eggs

of other birds, especially the common Robin. Gentry, however, states that they destroy the young of birds, a fact, as yet, unobserved by the writer.

In referring to this species, Wilson very aptly remarks: "As some consolation to the industrious cultivator, I can assure him that were I placed in his situation, I should hesitate whether to consider these birds most as friends or enemies, as they are particularly destructive to almost all the noxious worms, grubs and caterpillars that infest his fields, which, were they allowed to multiply unmolested, would soon consume nine-tenths of all the productions of his labor and desolate the country with the miseries of famine."

In concluding, attention is called to several series of stomach examinations, made at different periods during the past seven years, and from such work the reader can draw his own conclusions.

March—Twenty-nine examined. They showed chiefly insects and seeds; in five corn was present, and in four wheat and oats were found. All of these grains, however, were in connection with an excess of insect food.

April—Thirty-three examined. They revealed chiefly insects, with but a small amount of vegetable matter.

May—Eighty-two examined. Almost entirely insects, cut-worms being especially frequent.

June—Forty-three examined. Showed generally insects, cut worms in abundance; fruits and berries present, but to very small extent.

July—Twenty-four examined. Showed mainly insects; berries present in limited amount.

August—Twenty-three examined. Showed chiefly insects, berries and corn.

September—Eighteen examined. Showed insects, berries, corn and seeds.

October—During this month (1882), the writer made repeated visits to roosting resorts, where these birds were collected in great numbers, and shot three hundred and seventy-eight, which were examined. Of this number the following is the result of examinations, in detail, of one hundred and eleven stomachs:

Thirty, corn and *coleoptera* (beetles); twenty-seven, corn only; fifteen, *orthoptera* (grasshoppers); eleven, corn and seeds; eleven, corn and *orthoptera;* seven, *coleoptera;* three, *coleoptera* and *orthoptera;* three, wheat and *coleoptera;* two, wheat and corn; one, wheat; one, *diptera* (flies).

The remaining two hundred and sixty-seven birds were taken from the 10th to the 31st of the month, and their food was found to consist almost entirely of corn.

These examinations show that late in the fall, when insect food is scarce, corn is especially preyed upon by these birds, but during the previous periods of their residence with us, insects form a large portion of their diet.

In the West Chester (Pa.) *Daily News*, June 15, 1880, the following men-

tion of the Crow Blackbird was made on the authority of the late David Euen, Esq, of Phœnixville, Pa.: "A day or two since, while Edward Entwisle, and another resident (David Euen), of Phœnixville, were walking along French creek in that town, they saw a common Crow Blackbird fly to the water's edge and take therefrom a minnow which it swallowed." The fish-eating habit of the Crow Blackbird, in Pennsylvania, is of rare occurrence, and beyond the record above given by Mr. Euen there are no records, known to me, showing a piscivorous desire on the part of the species in this commonwealth. At various times in the past eight years, I have examined the stomach contents of some seven hundred Crow Blackbirds, captured in Pennsylvania and Delaware, yet in this large number nothing was found to lead one to suspect a fish-eating habit. In Florida, the Grackle, according to my investigations, takes most kindly to a fish diet. Since the latter part of February, 1885, I have dissected the alimentary tracts of forty-four of this species, seventeen of which were secured in Florida, along the St. John's river. These seventeen examples, obtained at various periods from March 1 to May 7, 1885, showed generally an insect-food preference—beetles, principally. Six of the number, however, revealed unmistakable evidences of having taken as nourishment fishes, as will be seen by this table:

No.	Date.	Locality.	Food-Materials.
1	March 3, 1885, . . .	Volusia county, Fla., . . .	Five small fishes, beetles and grub.
2	April 21, 1885, . . .	Orange county, Fla., . . .	Three fishes, beetles and mulberries.
3	April 10, 1885, . . .	Orange county, Fla., . . .	Remains of fishes, beetles, small seeds, etc.
4	March 14, 1885, . . .	Volusia county, Fla., . . .	Remains of fishes, beetle, oats and corn.
5	April 29, 1885, . . .	Volusia county, Fla., . . .	Cray-fish, minnow and different insects.
6	May —, 1885, . . .	Volusia county, Fla., . . .	Remains of fishes and green-colored beetle.

Of the forty birds above mentioned, twenty-seven were taken in Chester county, Pa., during May, June and July, feeding chiefly along the fertile banks of the Brandywine creek. In this series, however, not a single individual was found to possess a trace which would show in the northern birds a fish-food want. A Florida fisherman, during the early part of April, 1885, caught a number of "perch" which spoiled before a market could be found for them. The decaying carcasses were tossed into the river, to float away or to be "gobbled up" by the voracious "catties." Several of these defunct fishes lodged among the shell rocks lining the banks. Probably an hour after the cast-aways had lain along the riverside, three Crow Blackbirds were seen—quoting the phraseology of a "cracker" who was present at the time—"to jine de fish and feast 'emselves to plum fulness." After the departure of the sable visitants, an inspection of the feeding-place revealed that the birds had picked out the eyes of seven, or all but one, of the fishes, three of which were considerably torn about the abdominal regions. The mutilated condition of the belly muscles is mainly attributed to the fact that the fish had been eviscerated before having been thrown away, hence these incised parts were more accessible to mandibular action than other and unbroken

parts of the scaly anatomy. Certainly, there is no obvious reason why the abdominal and neighboring pectoral portions of a "perch" should be more palatable to the sprightly "White-eyed Jackdaw," as the native Floridians are accustomed to term the species.

The Bronzed Grackle (*Q. quiscula æneus*, Ridgw.) is the common Crow Blackbird found in the western part of Pennsylvania west of the Allegheny mountains. In eastern Pennsylvania this bird is rather rare. This variety differs from the typical *quiscula* chiefly in having a uniform brassy-colored body, and wings and tail purplish or violet, never bluish.

Family **FRINGILLIDÆ**. Finches, Sparrows, Etc.

THE SPARROWS, ETC.

Over thirty species of this, the largest North American family, are found in Pennsylvania, either as residents, summer residents, regular spring and fall migrants, or casual visitors. Some species, especially the male Grosbeaks, also the male Purple Finch, Dickcissel, Indigo-bird, Towhee, Crossbills, Junco, Red-poll and Goldfinch are highly colored, being conspicuously marked with either one or more of these colors, red, yellow, black and blue; others, in fact the majority, are plainly attired; the Snowflake, when found in this state, is showily dressed in a garb of white and brown. The eyes, in all species other than the Towhee, which are red or yellowish, are brown or hazel. During the breeding season these birds are commonly seen singly or in pairs; but, at other times, many of them, particularly the English Sparrow, Snowflake, Red-poll, etc., are to be observed in large flocks, and small flocks or companies of all but a few species, which occur here, are frequently seen in fields, woods, thickets or in tangled weeds, grasses and briery places about streams and bushy swamps. Species are also common and familiar visitors to our orchards, yards and gardens. They subsist mainly on a vegetable diet, consisting largely of divers seeds; but many of them, especially the English Sparrow, the Rose-breasted, Pine and Evening Grosbeaks, likewise the Purple Finch, the White-throated Sparrow and the two species of Crossbills, feed extensively on buds and other soft vegetable substances. The young of most, in fact nearly all, of these birds are fed largely on an insect diet, and during the breeding season many of the adult *Fringillidæ* also subsist to a considerable extent on different kinds of insect-life, particularly small larvæ, flies, spiders and the smaller beetles. Their nests are built usually in bushes or trees, but some build on the ground. Nearly all of these birds sing, "with varying ability and effect; some of them are among our most delightful vocalists"—(*Coues*). "Primaries 9; bill very short, abruptly conical and robust. Commissure strongly angulated at base of bill. Nostrils placed very high; rictal bristles usually obvious; wings usually rather long and pointed. Tarsi scutellate in front, but the sides with two undivided plates meeting behind and producing a rather sharp posterior ridge. Tail of twelve feathers, but variable in form."

Genus **COCCOTHRAUSTES** Brisson.

Coccothraustes vespertina (Coop.).

Evening Grosbeak.

Description (*Plate 92*).

Bill very large and stout, over ¾ of an inch long and a little less in width at base; color greenish-yellow.

Male.—Forehead, line over eye, lower part of back and rump, under tail-coverts and lower part of belly yellow; crown, tibiæ, tail and its upper coverts and wings

black; secondaries mostly white. Rest of head, neck all around and anterior parts of body, dusky olivaceous, becoming paler behind. Female and young much duller with less yellow, and more brownish-ash; lower parts very pale, almost white on belly. Length about 8¼; wing about 4½; tail 3.

Habitat.—Western North America, east to Lake Superior, and casually to Ohio, Pennsylvania, New York and Ontario; from the Fur countries south into Mexico.

The Evening Grosbeak first made its appearance in Pennsylvania in December last, and during the months of January, February, March and April (1890) scattered individuals or flocks containing from six to twenty or more were frequently seen. From my own personal observations, as well as from reports received through the courtesy of other observers, it appears these birds were quite common in many of the western, northern and central parts of the state, but rare, or not seen at least, in some of the eastern counties from the date of their first appearance to the present time (May 15, 1890). Referring to my note-book I find single birds, but mostly small parties, were observed at different periods from December 17 to April 12, inclusive, in the following counties: Erie, Crawford, Warren, Elk, Cameron, Susquehanna, Wyoming, Clinton, Lycoming, Venango, Beaver, Westmoreland, Somerset, Columbia, Washington and Lackawanna. Mr. Geo. P. Friant, of Scranton, obtained from a hunter in Wyoming county, in the latter part of April last, a number of these grosbeaks, which were at that time said to be abundant at West Nicholson. The stomach contents of a dozen or more specimens which I examined consisted chiefly of seeds and green-colored vegetable substances, apparently buds. From the *Forest and Stream* of May 8, 1890, the following article, written May 1, by Mr F. F. Castlebury, Montoursville, Lycoming county, is taken: "Early in last January a friend described to me a flock of strange birds he had seen the day before. From the imperfect description given I concluded they were Snow Buntings, and so paid no further attention to the matter. A few weeks later he killed three of them, and then I saw at once they were unlike any bird I had ever seen here. Upon investigation I found them to be Evening Grosbeaks. They have never before been recorded as appearing east of Ohio, and but seldom east of Lake Superior, but as is well-known, a number of specimens have been taken in this state and in New York during the past winter. The birds, numbering about forty, have kept together in a single flock all through their stay. Their food seems to consist entirely of wild cherry pits. They readily crack the stones with their stout bills, and a flock feeding on these makes a noise resembling a miniature Fourth of July celebration. The male has a loud, clear and beautiful song, while both birds have a peculiar piping whistle, which is apparently used as a call note, and is kept up constantly. Two or three weeks ago the birds became quite uneasy, keeping well to the tops of the trees and ranging for miles up and down the river; but they finally returned to their old haunts, and now seem to

have lost in a measure their tribal organization, and to-day, April 30, they are to be found in all parts of the grove, making love to each other in much the same manner as Turtle Doves, seemingly well contented with what I believe will prove to be their summer home."*

GENUS PINICOLA VIEILLOT.

Pinicola enucleator canadensis (CAB.).

Pine Grosbeak.

DESCRIPTION (*Plate 93*).

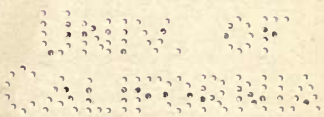
Bill and legs blackish.

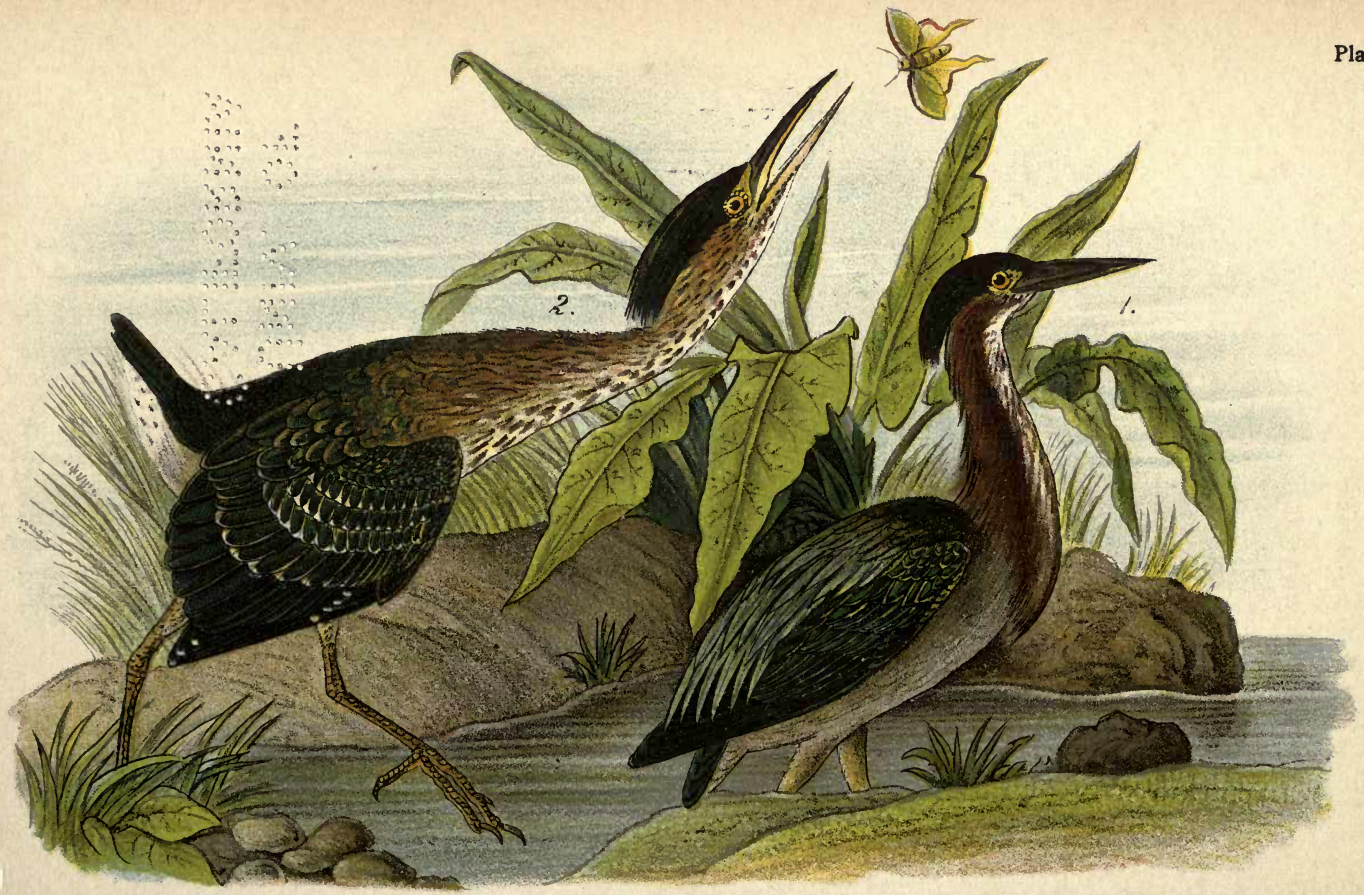
Male, adult.—General color light rose-pink; scapulars and feathers of back have dusky centers, giving a spotted appearance; belly and lower tail-coverts ashy or whitish; wings and tail dusky and edged with whitish; wings have two whitish bars. Female grayish with bright olive-yellow head and rump, and breast also, in some specimens, with a tinge of same. The young resemble the female. Length about 8¾ inches; wing 4.60; tail 4.10.

"*Habitat.*—Northern North America in general, breeding from northern New England, Labrador, etc., to Alaska (except coast south of the peninsula) and south in higher Rocky mountains to Utah and Colorado; in winter south to northern United States."—*Ridgway.*

Irregular winter visitor, much oftener met with in the pine and hemlock forests of the northern parts of the state than elsewhere. This species, when found here, is usually observed in small flocks, but oftentimes individuals are seen in company with English Sparrows, Crossbills, etc. In the winter of 1889–90 Pine Grosbeaks were very common in Susquehanna, Wayne, Wyoming and Lackawanna counties, from which localities the writer obtained, through the kindness of Mr. James C. Smith, of Montrose, and Mr. Geo. P. Friant, of Scranton, over forty specimens in various stages of plumage. In the neighborhood of Montrose, Susquehanna county, where these birds were particularly numerous last winter (1889–90) they were called by boys and hunters "Red English Sparrows." The stomach contents of twenty odd of these birds examined by the writer consisted principally of small seeds and buds. The buds of different trees, etc., are eaten by these Grosbeaks, but those of the hickory and maple are fed upon to a very considerable extent.

*Mr. F. F. Castlebury, in a letter dated September 29. 1890, informs me that the Evening Grosbeaks remained about Montoursville until May 11th, when they disappeared, being driven away by a gunner who killed and wounded several of them. Mr. Castlebury also adds that some of his neighbors claim that these Grosbeaks were seen at different times during the summer, but he is under the impression that the female Rose-breasted Grosbeaks (*Habia ludoviciana*), which were quite plentiful, were mistaken for the Evening Grosbeak. Mr. Ed. Allen, of Montoursville, to whom the writer is under obligations for several very fine specimens of Evening Grosbeaks, presented to Mr. F. F. Castlebury one of these birds which had been crippled; this bird soon became so tame that it would take food from the hand of its owner.





Green Heron.

1. Male; 2. Young.

GENUS **CARPODACUS** KAUP.

Carpodacus purpureus (GMEL.).

Purple Finch; Crimson Finch.

DESCRIPTION (*Plate 30; Figs. 1 and 2*).

Adult male.—Crimson; brightest on head; belly and lower tail-coverts whitish; wings and tail dusky; feathers on middle of back have dark centers. Female and young olivaceous-brown, paler below, and everywhere streaked, but have no red; immature males are found in various conditions of plumage.

Habitat.—Eastern North America, from the Atlantic coast to the plains. Breeds from the Middle States northward.

The Crimson Finch, so called from the crimson-colored dress of the adult male, is about as large as the common English Sparrow. This species breeds occasionally and sparingly in Pennsylvania, particularly in the northern* parts of the state—Erie, Crawford and a few other counties. I have found these birds to be much more numerous in the spring and autumn than in winter. They are found chiefly in forests, though it is not unusual to see them about houses, which they sometimes visit in company with other species of sparrows. These birds are mostly observed in flocks; in winter, however, it is not uncommon to find them singly or in pairs, especially in the southern parts of the commonwealth. In the spring I have noticed that their brown and cone-shaped bills are usually covered with particles of buds or other succulent vegetable substances, on which they mainly subsist at this season; the feathers of the forehead and throat are also more or less discolored by the juices of their plant food. The food of the Crimson Finch is made up chiefly of vegetable materials, particularly the buds and blossoms of different forest, fruit and shade trees. Various kinds of small seeds, as well as berries and some few insects are also eaten. I have examined the stomach contents of twenty-one Purple Finches captured in Chester county, Pa., in the latter part of March, during April and from May 1st to 15th. Sixteen of these birds had fed exclusively on buds and blossoms; three, small seeds; two, beetles and flies in addition to vegetable matter. In this locality the buds of the beech and maple trees constitute a very large proportion of their diet. Wilson writing of this species says: "This is a winter bird of passage, coming to us in large flocks from the north in September and October; great numbers remaining with us in Pennsylvania during the whole winter, feeding on the seeds of the poplar, buttonwood, juniper, cedar and on those of many rank weeds that flourish in rich bottoms and along the margins of creeks. When the season is very severe, they proceed to the south as far at least as Georgia, returning north early in April. They now fre-

* According to the observations of my friend Prof. August Kock, this species is a regular breeder in the city of Williamsport (Lycoming county). Their bulky nests, composed externally of twigs or small sticks, and lined internally with miscellaneous and soft materials, have always been found, by Prof. Kock, in a Norway or other pine tree. The gentleman named above says he has never known them to breed in woods in his locality, but always in trees along the streets or in yards.

quent the elm trees, feeding on the slender but sweet covering of the flowers; and, as soon as the cherries put out their blossoms, feed almost exclusively on the stamina of the flowers; afterwards, the apple blossoms are attacked in the same manner; and their depredations on these continued till they disappear, which is usually about the 10th or middle of May."

I have have never found the nest of this bird. According to different writers it is usually placed in evergreens or orchard trees, and is composed of grass, strips of bark and various vegetable fibers. The eggs, said to be, usually four in number, are described as being dull-green, spotted, chiefly about the larger end, with very dark-brown; they vary considerably in size, but average probably .86 long by .65 wide.

GENUS **LOXIA** LINNÆUS.

Loxia curvirostra minor (BREHM.).

American Crossbill.

DESCRIPTION (*Plate 93*).

Male dull red; wings and tail blackish; female brownish-olive, tinged with yellow and streaked with dusky. Immature birds, often considerably different from the adults, can always be recognized by their sickle-shaped bills and the absence of white wing bands. Length about 6 inches; extent about 11.

Habitat.—Northern North America, resident sparingly south in the eastern United States to Maryland and Tennessee and in the Alleghanies; irregularly abundant in winter; resident south in the Rocky mountains to Colorado.

Two species and one geographical race,* of the genus *Loxia* are found in North America. Both species occur in Pennsylvania. Crossbills, as the name would indicate, can, by their bill alone, be known from all other of our feathered visitants. The American Crossbill and the White-winged species may be distinguished without difficulty, if you remember that the first-named never has white bands on the wings, and the other species, whether in adult or immature plumage, has, as its specific name signifies, white wing marks. The Crossbills, inhabitants chiefly of pine and hemlock forests, are frequently met with, during autumn and winter months, in various sections of this commonwealth.

The American Crossbill breeds regularly in Clinton, Clearfield, Luzerne, Lycoming and Cameron counties, and also doubtless in the higher mountainous regions in other parts of the state. Dr. W. L. Hartman, of Pittston, has taken the nest and eggs of this bird, in March, in Luzerne county, and Prof. August Kock has observed the old birds with their young early in May feeding on the buds and blossoms of apple trees about Williamsport. Dr. Van Fleet informs me they are found at all seasons about Renovo. In nearly all the mountainous regions of Pennsylvania the Crossbills are quite common in winter, and are found often in large flocks, which number sometimes two hundred, frequent-

* The Mexican Crossbill (*Loxia curvirostra stricklandi*, Ridgw.), found in Colorado, southern Arizona and the table lands of Mexico, is said to differ from the American Crossbill in being brighter in color and having a slightly larger bill; the lower mandible especially is heavier than that of *L. c. minor*.

ing chiefly pine and hemlock trees, on the seeds of which they mainly subsist. They also visit log cabins and other buildings about the forests, and pick at the mud used to fill up the chinks between the logs, etc. The nest of this bird is said to be built usually in a coniferous tree and composed of twigs, strips and fibers of bark, hair, small roots, grasses, etc.; "eggs, three to four, .75 by .57, pale-greenish, spotted and dotted about larger end with dark, purplish-brown, with lavender shell-markings."—*Coues.*

Loxia leucoptera Gmel.

White-winged Crossbill.

Description (*Plate 93*).

Size about same as American Crossbill.

Male.—General color rosy-red; scapulars, wings and tail black.

Female.—General color greenish-olive, breast yellowish; wings and tail dusky-brown. The young, very similar to female, are streaked with dusky, and all have tips of middle and greater coverts white, forming two showy white wing bands, which in any plumage, and their peculiar sickle-like bills, will enable you to distinguish them from other of the *Fringillidæ.*

Habitat.—Northern parts of North America, south into the United States in winter. Breeds from northern New England northward.

The White-winged Crossbill from all the information I can obtain does not build in Pennsylvania where it occurs only as a winter visitor. This species is found in the same localities as the American Crossbill, but, unlike the last-mentioned bird, it appears to be much less common and more irregular in its visits. In the winter of 1889–90 White-winged Crossbills were very common in Wyoming, Lackawanna and Susquehanna counties. Crossbills are nearly always to be found in flocks. The food of this species is similar to that of the American Crossbill.

Genus **ACANTHIS** Bechstein.

Acanthis linaria (Linn.).

Redpoll; Little Snow-bird.

Description.

The small and very acute bill is yellow, a dusky streak extends backward from point of each mandible; legs, feet, claws and iris dark; tail deeply forked.

Adult male.—Above brownish-yellow, each feather streaked with dark-brown and margined with grayish; tail and wings dusky edged with whitish; two white wing bars; a narrow frontal space, throat patch and lores dull black (feathers of frontal region somewhat whitish). Top of head red; breast and sides more or less colored with red; rump and upper tail-coverts streaked with white and dusky, and in some specimens tinged with pinkish; lower parts generally white but sides and under tail-coverts have dusky streaks.

Female.—Very similar to male, but breast is usually of a yellowish tint and not

red; top of head red but not as bright as in male. The red on top of head of young male is often of a coppery hue. Length about 5½ inches; extent about 9 inches.

Habitat.—Northern portions of Northern Hemisphere, south irregularly in winter, in North America, to the middle United States (Washington, D. C., Kansas, southeastern Oregon).

The Redpoll, a native of high northern latitudes, occurs in the southern parts of Pennsylvania only as an irregular and occasional winter visitant, but in some sections of the northern portions of the state it appears to be a rather common and regular winter visitor. Redpolls were exceedingly abundant in eastern Pennsylvania in the winter of 1878–79, at which time they were observed about fields and houses in flocks of from twenty to two hundred or more. Last winter (1889–90) they were found in large flocks in the neighborhood of Montoursville, Lycoming county, by Mr. F. F. Castlebury, and they were also quite plentiful in different sections of Wyoming, Lackawanna and Susquehanna counties, where a number of specimens were obtained by Mr. George P. Friant, of Scranton, and myself. The note of the Redpoll is very similar to that of the American Goldfinch (*Spinus tristis*, Linn.). The food, during their sojourn with us, consists almost entirely of seeds of various grasses and weeds; the buds of different trees and some few insects are also eaten.

Genus **SPINUS** Koch.

Spinus tristis (Linn.).

American Goldfinch; Salad-bird; Wild-canary; Yellow-bird; Thistle-bird.

Description (*Plate 31. Fig. 1, adult male in summer*).

Legs, feet and bill flesh color. The *male* in early autumn loses his black cap, and his bright yellow upper and lower parts change to a dull brownish or greenish-yellow, similar to the general plumage of the female. The male in winter may often be distinguished by the darker tail and wing feathers with their more conspicuous white or whitish markings.

Female.—No black cap; upper parts olivaceous; wings and tail dusky, marked with whitish as in male; lower parts whitish, more or less tinged with yellowish.

Young.—Like winter adults, but duller in color. Length about 5¼ inches; extent about 9 inches.

Habitat.—North America generally, breeding southward to the middle districts of the United States (to about the Potomac and Ohio rivers, Kansas and California), and wintering mostly south of the northern boundary of the United States.

The American Goldfinch is a common resident in Pennsylvania during all seasons. These birds are usually observed in flocks which move from one locality to another as their food diminishes. Even in the breeding season (June, July and August), it is not uncommon to find several families nesting within a short distance of each other. The males in summer frequently associate in small flocks. The nest, an exceedingly neat and beautiful cup-shaped structure, is composed exter-

Ruby-throated Humming-bird.

1. Male; 2. Female.

nally of various pliant plant substances, and lined inside with downy materials chiefly of a vegetable character; it is placed usually in the crotch of a small tree in the orchard, garden, or along the roadside. I have mostly found their nests, in the vicinity of West Chester, in small hickory and maple trees. Eggs commonly five, white, with faint bluish tint, .66 by .50. This Goldfinch, particularized by naturalists as *tristis*, from its low and plaintive notes, is known by a number of common names which have reference either to his color or the seeds, etc., of plants on which he feeds. These birds subsist mainly on vegetable materials, particularly different kinds of small seeds of grasses, weeds, cultivated flowers, etc. The Salad-bird, like the Crimson Finch, is fond of feasting on the blossoms of apple, cherry and maple trees; the seeds of the dandelion, thistle and sunflower enter largely into his bill of fare. During the summer months, especially when they have young, the food consists principally of insects, such as small beetles, plant-lice, different species of flies and small grasshoppers; also small larvæ.

Spinus pinus (WILS.).

Pine Siskin; Pine Finch.

DESCRIPTION (*Plate 31. Fig. 2*).

Bill very acute; bill, feet and iris brown; tail forked; above brownish-olive; beneath whitish, feathers streaked with dusky; concealed bases of tail feathers and quills, together with their inner edges, sulphur-yellow; outer edges of quills and tail feathers yellowish-green; two brownish-white bands on the wing; a bright yellow spot in some specimens back of posterior wing-band.

Young.—Similar to adults but more rusty-brown. Length about 4.80 inches; extent about 8.75 inches.

Habitat.—North America generally, breeding mostly north of the United States and in the Rocky mountain region; in winter south to the Gulf states and Mexico.

The Pine Finch is a common winter resident in Pennsylvania. It arrives in this region early in October and departs usually in April. These birds are found mostly in flocks of twenty to thirty each; oftentimes solitary individuals or pairs are seen in company with snowbirds and different species of sparrows. As its specific name would indicate it delights especially to dwell in pine forests. They feed on small seeds, cones of different pines, small berries, some few insects, and also, to a small extent, on buds of maple and other trees. I have, several times during the summer months, seen Pine Finches in the mountainous regions of our state where, I have no doubt, some every season rear their young. Prof. August Kock informs me that this species occasionally at least, if not regularly, breeds in the mountainous districts of Lycoming county.

Genus PLECTROPHENAX Stejneger.

Plectrophenax nivalis (Linn.).

Snowflake; Snow Bunting; White Snow-bird.

Description (*Plate 94*).

Length about 7 inches; extent about 12½; legs black.

* *Adult in winter plumage.*—Bill brownish-yellow, darker at point; upper parts generally brownish and blackish; central tail feathers and most of the primaries for about half their length towards ends. blackish; under surface of wings, most of secondaries, and lateral tail feathers chiefly white. Under parts chiefly white, sides of head and chest are more or less distinctly marked with rusty. The female is smaller than male and has less white on wing.

Habitat.—Northern parts of the Northern Hemisphere, breeding in the Arctic regions; in North America, south in winter into the northern United States, irregularly to Georgia, southern Illinois and Kansas.

This beautiful bird, readily recognized by its white and rusty plumage occurs in Pennsylvania only as an occasional winter visitant, except in the region about Lake Erie, where Mr. Sennett, and other observers assure me it is found as a regular winter sojourner. In 1889, Mr. Geo. Russell, of Erie city, killed one of these birds as early as the 12th of October, at the bay, where I observed this species in flocks of two hundred or more, in November and December of the same year. When noted in the other parts of the state Snowflakes are usually seen in flocks, which sometimes contain one, two or three hundred each. The Snow Bunting, during its stay in this region, subsists mainly on seeds of various weeds, grasses, etc., which it finds in fields and meadows.

Genus CALCARIUS Bechstein.

Calcarius lapponicus (Linn.).

Lapland Longspur.

Description.

Bill moderate; hind claw straightish with its digit longer than the middle toe and claw.

Adult male.—Head and throat jet black, bordered with buffy or whitish, which forms a postocular line separating the black of the crown from that of the sides of the head; a broad chestnut cervical collar; upper parts in general blackish, streaked with buffy or whitish on edges of all the feathers; below whitish, the breast and sides streaked with black; wings dusky, the greater coverts and inner secondaries edged with dull bay; tail, dusky, with an oblique white area on the outer feathers; bill yellowish, tipped with black; legs and feet black. Winter, males show less black on head and the cervical chestnut duller; the female and young have no continuous black on head, and the crown is streaked like the back, and there are faint traces of the cervical collar. Length about 6½; extent about 11½ inches.—*Coues.*

* In summer or breeding dress the adults, particularly the males, are pure white, the back, wings and tail variegated with black. Bill black. The female is quite similar, but has a little more brownish.

1. American Crow. *2, 3. Cow-bird.*
Female and Male.

Habitat.—Northern portions of the Northern Hemisphere, breeding far north; in North America south in winter to the northern United States, irregularly to the Middle States, accidentally to South Carolina, and abundantly in the interior to Kansas and Colorado.

The Lapland Longspur is a tolerably common and regular visitor about Lake Erie, and at the bay, from November until late in March, when it is found in small flocks, or scattered individuals are often seen in company with Horned Larks, Snowflakes or other species of the sparrow tribe. In other parts of Pennsylvania this species occurs as a rather rare and irregular winter visitor, and it appears to visit the eastern and southern parts of the state only in excessively cold weather, accompanied by great snow falls. Feeds on seeds of weeds and grasses, and frequents the same localities as the Snowflake.

GENUS **POOCÆTES** BAIRD.

Poocætes gramineus (GMEL.).

Vesper Sparrow; Grass Finch; Bay-winged Bunting.

DESCRIPTION (*Plate 32. Fig. 1*).

Length about 6 inches; extent about 10 inches.

No yellow anywhere; outer tail feathers partly white, above brownish streaked with dusky; below dull white, streaked on sides, throat and breast with pale brownish; lesser wing-coverts chestnut.

Habitat.—Eastern North America to the plains, from Nova Scotia and Ontario southward; breeds from Virginia, Kentucky and Missouri northward.

The Bay-winged Bunting is a common summer resident in Pennsylvania, and during the winter months is quite frequently to be met with in the southern portions of the state. This plainly attired songster may readily be recognized from other of the *Fringillidæ* by the bright chestnut colored lesser wing-coverts and the white lateral tail feathers, the latter being most conspicuous when the bird is flying. These birds inhabit chiefly dry pasture fields and meadows; they visit plowed grounds, and are frequently to be observed perched on fence rails in fields or along the roadsides, and, as Nuttall remarks, they are fond of dusting themselves and basking in dry places. Although the Vesper Sparrow is mainly terrestrial in habits, he may often be seen searching most industriously in apple trees for various forms of insect life. These birds, when not engaged in breeding, are more or less gregarious and are often seen in company with other sparrows. The nest, composed of dried grasses, is built in a depression in the ground. The top of the nest is generally on a level with the hollow in which it rests; sometimes it is partly concealed by overhanging grasses; eggs, four to five, grayish-white or rusty-brown, spotted, lined and blotched with brown and black; about .83 of an inch long and .60 of an inch wide.

Bay-winged Buntings subsist principally on seeds of grasses, weeds

and other plants. During the summer they feed to a considerable extent on beetles, flies, spiders, earth-worms and various larvæ; they likewise eat strawberries, mulberries, blackberries, and, according to Mr. Gentry, the fruit of the wild choke-cherry. The buds of apple, beech and maple trees are also occasionally fed upon.

Genus **AMMODRAMUS** Swainson.

Ammodramus sandwichensis savanna (Wils.).

Savanna Sparrow.

Description.

"Feathers of the upper parts generally with a central streak of blackish-brown; the streaks of the back with a slight rufous suffusion laterally; the feathers edged with gray, which is lightest on the scapulars; crown with a broad median stripe of yellowish-gray; a superciliary streak from the bill to the back of the head, eyelids, and edge of the wing yellow; a yellowish-white maxillary stripe curving behind the ear-coverts, and margined above and below by brown; the lower margin is a series of thickly crowded spots on the sides of the throat, which are also found on the sides of the neck, across the upper part of the breast, and on the sides of the body; a few spots on the throat and chin; rest of under parts white; tarsus flesh color; feet brown; iris dark brown. Length about 5.25 inches; extent about 8.75."—*B. B. of N. A.*

Habitat.—Eastern province of North America, breeding from the northern United States to Labrador and Hudson's Bay territory.

The Savanna Sparrow is a moderately abundant spring and fall migrant in eastern Pennsylvania. During mild winters it is not unusual to find this species in the southern portions of this state; ordinarily, however, these birds arrive in Pennsylvania about April 1, and, in pairs or parties of five or six, may be found frequenting chiefly low damp ground in open fields (along fences), meadows and the borders of grassy ponds and pools. I have never observed this sparrow, in the spring, later than April 25. Dr. John W. Detwiller, of Bethlehem, has found the Savanna Sparrow nesting in Pennsylvania; Mr. Sennett also informs me that it breeds sparingly in Crawford and Erie counties, and Dr. Van Fleet has observed it as a rare native in Clinton county. Never having been fortunate enough to find the nest or eggs of this bird, I quote the following concerning them from Dr. Coues' *Key:* "Nest sunken in ground flush with surface, of a few grasses and weed-stalks; eggs, four to six, .70 by .50, varying interminably in their motley coloring; usually heavily clouded and blotched with dark brown; most like those of *Poœcætes*, but smaller." This bird is seldom seen to perch on trees or bushes, sometimes, though not often, he may be observed to alight on the lowermost rails of fences; but, occasionally, usually when frightened, I have observed them fly into trees and crouch close to the limbs as if endeavoring to hide. When passing southward the Savanna Sparrows make their appearance in this locality about the middle of September. Their food

consists principally of different kinds of small seeds, also small beetles, grasshoppers, spiders, ants and small mollusca.

Ammodramus savannarum passerinus (Wils.).

Grasshopper Sparrow; Yellow-winged Sparrow.

Description (*Plate 32. Fig. 3*).

"Bill stout; legs flesh color; tail double rounded. Above brownish-rufous, margined narrowly and abruptly with ash color; reddest on lower part of back and rump; the feathers all abruptly black in the central portion; this color visible on the interscapular region, where the rufous is more restricted; crown blackish, with a central and superciliary stripe of yellowish tinged with brown, brightest in front of the eye; bend of the wing bright yellow; lesser coverts tinged with greenish-yellow; quills and tail feathers edged with whitish; tertiaries much variegated; lower parts brownish-yellow; belly white or nearly so; feathers of upper breast and sides of body with obsoletely darker centers.

Young.—Very similar to adult; upper part of breast streaked with dark brown, much more distinct than in the adult, and exhibiting a close resemblance to *A. henslowii*. Feathers of upper parts with less brownish rufous but more ashy edgings. Length about 5 inches; extent about 8 inches."—*B. B. N. A.*

Habitat.—Eastern United States and southern Canada to the plains, south to Florida, Cuba, Porto Rico and coast of Central America.

This bird is somewhat irregularly distributed. In the southern and southeastern portions of our state it is quite common from about May 1 to the middle of September. In Crawford and Erie counties, or in the extreme northwestern part of the commonwealth, Mr. George B. Sennett has found it to be a rare summer sojourner. It is reported to be a rather common summer resident in central Pennsylvania. I have found them to be very common in summer at State College, in Centre county. The name Grasshopper Sparrow is given because its note bears a very close resemblance to that of the grasshopper. In Chester and the neighboring counties this bird is a common frequenter of dry sandy meadows, clover and grass fields, about which it may often be seen perched on the top of low weeds or on posts and fence rails. This is one of the sparrows to be seen in the summer time perched on the fences along the roadsides. I have never observed a bird of this species in a tree, and it rarely is seen to perch on bushes. The nest is built on the ground, and is usually concealed by a tuft of grass or a bunch of weeds. It is composed of dry grasses, horse hair and fine roots; eggs, four or five, white with reddish-brown spots, .72 length by .61 breadth.

The Yellow-winged Sparrow, during its residence with us, feeds principally on different kinds of insect life; the small seeds of various plants, grasses and weeds are also taken. Beetles, grasshoppers, flies, earthworms, etc., are eaten in large numbers; the young, when in charge of the parents, are fed chiefly on spiders and larvæ.

Ammodramus henslowii (Aud.).

Henslow's Sparrow.

DESCRIPTION.

A little smaller but very similar to the Grasshopper Sparrow; tail a little longer; top of head heavily streaked with black, divided by pale greenish-gray stripe; occiput and back of neck greenish-gray with black streaks; a blackish streak back of eye, and another one back of lower mandible, throat and belly whitish, conspicuously streaked with black; the breast, sides and flanks are light yellowish-brown; upper surface of wings mostly chestnut; back and scapular feathers chestnut with conspicuous black centers, edged with whitish, except towards the rump, where the edgings are mainly olivaceous or buff.

Habitat.—Eastern United States, west to the plains, north to southern New England and Ontario.

Henslow's Sparrow, according to my observation, occurs in Pennsylvania as a rare spring and fall migrant. It frequents fields and meadows, and it easily escapes notice by hiding in the weeds and grasses. Nests of this species have been taken in our state by Dr. Detwiller, of Bethlehem, and Mr. Roddy, of Millersville. Dr. Coues says it is "common about Washington (D. C.), where it breeds in fields and meadows; nest on the ground in tufts of grass. Eggs, four to five, greenish-white, profusely speckled with reddish, .75 by .57." This sparrow arrives here about the first of May and departs in September. Food about same as that of the Grasshopper Sparrow.

Genus ZONOTRICHIA Swainson.

Zonotrichia leucophrys (Forst.).

White-crowned Sparrow.

DESCRIPTION (*Plate 95*).

Length about 7¼ inches; extent about 10½; *no* yellow on head or wing, as in the next species. Adult may be known by conspicuous black and white head stripes, and the light grayish or ashy markings well shown in plate. "Young, first winter, head-stripes chestnut-brown and dull buff; otherwise similar to adult. Young, first plumage, crown dusky-blackish on sides, the middle whitish, streaked with dusky; throat and breast more or less streaked with dusky."—*Ornith. of Ill. Ridgw.*

Habitat.—North America at large, breeding chiefly in the Rocky mountain region (including Sierra Nevada) and northeast to Labrador.

Regular, but not common spring and fall migrant, and occasionally a few are found during mild winters in the southern parts of the state. This species frequents the same localities as the White-throated Sparrow, but it is less frequently seen in woods and orchards than the last-mentioned bird, being mostly found about brush heaps, along hedge-rows and bushy places in fields and near the borders of woods, etc. Its food consists chiefly of small seeds of different grasses, weeds, etc., and it also feeds to some extent on buds and blossoms of different trees, bushes, etc.

1. Red-breasted Nut-hatch.
Male.

2, 3. Purple Martin.
Male and Female.

Zonotrichia albicollis (Gmel.).

White-throated Sparrow.

Description (*Plate 95*).

Size about same as *leucophrys*.

Male.—Two broad black stripes on crown divided by a narrow white line, a showy *yellow stripe*, from bill to middle of eye, joins a white stripe which runs back to the occiput; throat patch white; edge of wing yellow. Upper parts mostly chestnut streaked with black; two showy white wing bars; sides of head, neck in front, and breast, ashy or pale lead color. The female is similar but duller. The young and most specimens taken in autumn have throat, breast, and sides, more or less streaked with dusky. In a large number of specimens before me I see a trace of *yellow* between the eyes and bill, as well as on edge of wing. These yellow markings and the large size are sufficient to identify the species.

Habitat.—Eastern North America, west to the plains, north to Labrador and the Fur Countries. Breeds in northern Michigan, northern New York and northern New England, and winters from the Middle States southward.

This beautiful sparrow, one of our most common spring and fall migrants, is found usually in small flocks about woods, apple orchards, gardens and shrubbery. In the spring, particularly in April, and the early part of May, the White-throats subsist largely, indeed chiefly, on the buds and blossoms of the apple, beech and maple trees. During their vernal migrations they may be observed, singly or in flocks, devouring the tender growth of beech trees, along the edges of woods, particularly those in the neighborhood of running streams. While it is true that the buds and blossoms of apple, maple and some few other trees are eaten, I am quite certain that their favorite articles of diet, in the way of buds and blossoms, are those of the beech trees. The damage which these birds do to apple or other fruit trees is so trifling that the farmer or fruit-grower should not be prejudiced against them. This species feeds also on various small seeds and different insects. The White-throated Sparrow is not uncommon as a winter resident in several of the southern counties of Pennsylvania.

Genus **SPIZELLA** Bonaparte.

Spizella monticola (Gmel.).

Tree Sparrow.

Description (*Plate 94*).

Length about 6 inches; extent about 9½; the long blackish tail feathers are edged with whitish; maxilla dark brown; mandible yellowish; legs brown; toes blackish; crown chestnut (in many specimens the crown feathers, especially in center, are bordered with grayish); broad whitish line over eye, and back of eye a chestnut streak; above, especially middle of back, brownish with dark streaks and paler edgings; lower parts whitish; ashy throat and neck, and brownish on sides and flanks. *No* dusky streaks on lower parts, but a conspicuous dusky *spot* in *middle* of *breast*.

Habitat.—Eastern North America, westward to the plains, and from the Arctic ocean; south in winter, to the Carolinas, Kentucky and eastern Kansas. Breeds north of the United States, east of the Rocky mountains.

This hardy sparrow, the largest of the genus, is an abundant winter resident from late in October to about the middle of April. We find them in flocks, often in company with Snow-birds and other sparrows, frequenting briery thickets, shrubbery, old fields where various weeds abound, and about hedge rows. Weedy spots near the edge of woods, or similar situations in or near briery places along the borders of small creeks are also favorite feeding grounds for them. The food of this species during its stay with us, consists almost entirely of the seeds of various weeds, grasses, etc.; cedar berries and wild grapes are also sometimes fed upon. I have never known the Tree Sparrow to disturb the buds or blossoms of any trees or bushes, as some writers assert it is accustomed to do in the spring before migrating northward. The name of Tree Sparrow is given, not because the bird is always found in trees or bushes, but from its common habit of flying from the ground or thickets into trees when disturbed. This bird not only frequently nests on the ground, but likewise collects the greater portion of its food from the earth. Dr. John W. Detwiller, of Bethlehem, informs me that he had for some years, several pairs of these birds in an enclosure of network, 24x75 feet and about 12 feet high. They built nests, but in only a few instances did they lay their full sets of eggs, and none succeeded in hatching them.

Spizella socialis (Wils.).

Chipping Sparrow; Chippy.

Description (*Plate 30. Fig. 3*).

Length about 5½ inches; extent about 8½; bill dark-brown or blackish; legs pale-brownish; feathers of forehead about base of maxilla black; crown bright-chestnut; a whitish stripe from base of maxilla, along the chestnut crown; black spot in front of eye and a black streak behind it; below whitish, or pale ashy, and unspotted; two whitish and narrow wing bars; rump, back and sides of neck ashy; middle of back brownish, with conspicuous black streaks.

Young.—Crown brownish, streaked with blackish, streak over eye yellowish-white; breast and sides with dusky lines; bill light brown.

Habitat.—Eastern North America, west to the Rocky mountains, north to Great Slave Lake, and south to eastern Mexico.

The Chipping Sparrow, so named from its note, is an abundant summer resident from early in April to the latter part of October. In the spring these birds are generally seen singly or in pairs; in the late summer and fall the adults and young collect together and are to be found in flocks in company with other species, especially the Field and Vesper Sparrows. Chipping Sparrows are common frequenters about the habitations of man during the breeding season, but after rearing their

young they repair to fields and bushes preparatory to migrating southward. The nest, which is built in trees or shrubbery, is made up of dried grasses, or other fine vegetable materials, and lined with horse hair. The bluish-green eggs, four or five in number, are marked usually on the larger end with a ring of purplish and blackish-brown spots. They measure about .70 by .55 of an inch.

This species, in the early spring and autumn, subsists principally on the small seeds of different weeds and grasses; in the summer months both the adults and young feed mainly on an insect diet, small beetles, ants, flies, spiders and numerous small "worms" are eagerly devoured. Pieces of bread, cake, or small particles of meat, are also eaten with apparent relish.

Spizella pusilla (WILS.).

Field Sparrow.

DESCRIPTION (*Plate 32. Fig. 2*).

Size about the same as the Chippy, but tail is longer than that of *socialis*. Bill light reddish; crown dull-chestnut, with mostly an indistinct grayish stripe in center; *no black* or *white on head;* back quite rusty, with blackish streaks; sides of head more or less rusty; back of neck ashy, washed with rusty; below whitish and unmarked, more or less tinged, especially anteriorily, and on sides, with grayish and pale rusty.

Young.—Colors similar to adult but duller, breast and sides more or less streaked with dusky. Length about 5¼ inches; extent about 8 inches.

Habitat.—Eastern United States and southern Canada, west to the plains.

Common summer resident from April to November, and during mild winters a few of these birds are sometimes found with us. The Field Sparrow, as its name signifies, is a frequenter of fields; it delights especially to inhabit sandy weed-grown fields or other uncultivated areas where numerous small bushes, particularly wild roses, are growing. Its somewhat mournful, yet sweet and entertaining, song may be heard at all times of the day. The nest is built on the ground or in low bushes, and is composed chiefly of grasses, leaves and hair; eggs, four or five, white, spotted with reddish brown, measure about .70 by .50 of an inch. In the early spring, fall and winter months, this species feeds mainly on small seeds of various weeds and grasses. In summer the old and young subsist largely on different forms of insect life, such as small beetles, flies, ants, spiders, grasshoppers, crickets, earth-worms, and different larvæ. They also feed on raspberries, blackberries and other similar soft fruits; it is not uncommon to see the bill and feathers about the head and neck of this bird more or less discolored by the juices of such fruit.

Genus **JUNCO** Wagler.

Junco hyemalis (Linn.).

Slate-colored Junco; Snow-bird; Black Snow-bird.

Description (*Plate 33. Fig. 3 and 4*).

Length about 6¼ inches; extent about 9¾.

Young in first plumage.—Above blackish and rusty-brown in numerous streaks; belly whitish, rest of lower parts profusely streaked with blackish and brownish; outer tail feathers white like adults; maxilla blackish; mandible paler about base, but dark at tip.

Habitat.—North America at large, but chiefly east of the Rocky mountains, breeding from the higher parts of the Alleghanies and northern New York and northern New England northward. South in winter to the Gulf States.

The Snow-bird is a summer resident in nearly all the higher mountain ranges in Pennsylvania, but in no section of the state have I ever seen them as abundant in summer as they are along the line of the Bradford, Bordell and Kinzua railroad in McKean county, where their nests may be seen, often within a few yards of each other, in the sides of the banks. They are also common breeders at Kane, on the Philadelphia and Erie railroad. Prof. August Kock has found the Junco breeding abundantly in June about Little Pine creek in Lycoming county. Late in September the Snow-birds retire from their summer resorts and are found during the winter months, and until about the middle of April, in the valleys and lowlands, particularly in the lower half of the state. This well-known species can readily be recognized by its whitish bill, the dark colored head, neck, back and throat, its white under parts and the white lateral tail feathers, the latter being most conspicuous when the bird is flying. Although these birds are found in all places, they are most plentiful in bushes, along the banks of streams, old weed-grown fields, fence rows and bushy tracts about the margins of woods. The nest, composed of dried grasses, roots, etc., lined with various soft materials, is placed on the ground. The eggs, according to Dr. Coues, number "four or six, white, sprinkled with reddish and darker brown dots, about .80 by .60." During the fall, winter and spring Snow-birds feed almost entirely on seeds of divers weeds and grasses. Like the Chippy, this bird often is seen about houses, ready to pick up crumbs, etc., which are thrown out.

Genus **PASSER** Brisson.

Passer domesticus (Linn.).

English Sparrow; European House Sparrow.

Description (*Plate 33. Figs. 1 and 2*).

Male.—Bill black, legs and feet brown; above reddish brown, the back streaked with black; crown and under parts brownish ash; chin and throat black; white wing-bar; a large patch of chestnut on each side of head, commencing over and back

of eyes and spreading backwards to sides of neck; lesser wing-coverts bright chestnut.

Female.—Duller colored and lacking the black on chin and throat; pale brown stripe back of eyes; bill dark-brown, lower mandible yellowish at base.

Young.—Very similar to female but male often recognizable by a few black patches on throat and chin.

Habitat.—Europe, etc. Introduced about twenty years ago into the United States, where it has become naturalized in nearly all inhabited districts.

Abundant resident about buildings. Nests in bird boxes, holes in trees, on branches of trees, in vines and in various places about houses and other buildings. The nest is composed of dried grasses, pieces of string, etc., lined with an abundance of feathers. The dull-whitish eggs, from four to seven in number, are thickly spotted and streaked with different shades of brown. They measure about .90 by .62 of an inch. In this locality at least two, and probably more, broods are reared in a season. The English Sparrow, as this species is commonly known throughout the United States, is universally despised by farmers, fruit-growers and naturalists because of its pernicious habits. In the spring it feeds largely on the buds of fruit trees, bushes and vines, chief among which may be mentioned the pear, apple, peach, plum, cherry, currant and grape. Different garden products, such as lettuce, beans, peas, cabbage, berries, pears, apples and grapes are greedily fed upon The sparrow greatly damages the corn crop, tearing open the husks, devouring the tender part of the ear and exposing the remainder to the ravages of insects and to atmospheric changes. It alights on fields of wheat, oats and barley, consuming a large quantity, and, by swaying to and fro on the slender stalks and flapping its wings, showers the remainder on the ground. In addition to a much varied vegetable diet, the sparrow has been known to kill and devour the young of other small birds. Our native song and insectivorous birds, viz: the Robin, Bluebird, Wren, Chippy, Song Sparrow, Red-eyed Vireo and some few others, which were formerly plentiful residents in our lawns, parks and gardens, have rapidly and steadily diminished since the hosts of pugnacious sparrows have appeared. This species is more or less gregarious at all seasons of the year. When not engaged in rearing their young they are always observed in flocks. In the late summer and autumn they assemble in flocks of hundreds and daily repair to the wheat and cornfields in the vicinity of cities and towns, where they commit serious depredations, that are only checked by harvesting the crops. In 1883 the members of the West Chester Microscopical Society, and several farmers' clubs of Chester, Delaware and Lancaster counties, recognizing the great injury which was being done by this feathered pest, passed resolutions and petitioned our Legislature, then in session, to repeal that portion of the act of Assembly which made it a misdemeanor to kill the English Sparrow. Through the prompt and energetic efforts of Senators A. D. Harlan, of Chester county, Thomas V. Cooper, of Delaware county, and

Hon. M. S. Quay, of Beaver county, the law was so amended that the killing of English Sparrows, and the destroying of their nests, eggs or young at all seasons of the year is now legalized.

GENUS **MELOSPIZA** BAIRD.

Melospiza fasciata (GMEL.).

Song Sparrow; Ground Chippy.

DESCRIPTION (*Plate 30. Fig. 4*).

Length about 6¼ inches; extent about 8½; bill, legs and feet brownish; lower mandible paler at base; general color of upper parts brownish streaked with blackish, grayish and different shades of brown; crown dull brownish with an indistinct grayish line in middle; a whitish line over eye from bill to occiput; below white or whitish with numerous conspicuous dark-brown streaks on breast, fore-neck and sides; a showy black spot in middle of breast. The young are very similar to adults but colors duller, more blended and lower parts are more yellowish and the streaks are much less in size.

Habitat.—Eastern United States to the plains, breeding from Virginia and the northern portion of the Lake States northward.

Common resident, but never seen in large flocks. Frequents in the summer, fence-rows, shrubbery in swamps, fields and gardens. Although this species is found during the summer about bushy, briery and weed-grown places along streams, ponds, ditches, etc., it is most abundant in these last named localities during the winter. The appellation Song Sparrow is given because it is one of our most pleasing songsters. In the dreary winter months the melodious voice of this little minstrel is about the only bird melody one is apt to hear. The nest, composed chiefly of grasses, leaves, weeds, etc., lined with fine grasses and weeds, is built on the ground or in a low bush. The eggs, mostly five, vary greatly both in size and markings; they are greenish or dull bluish-white, variously spotted with different shades of brown, and measure about .82 by .60 of an inch. Two, and sometimes three, broods are raised in a season. During the breeding season this species feeds to a more or less extent on different forms of insects; at other times they subsist principally on the seeds of grasses, weeds, etc.

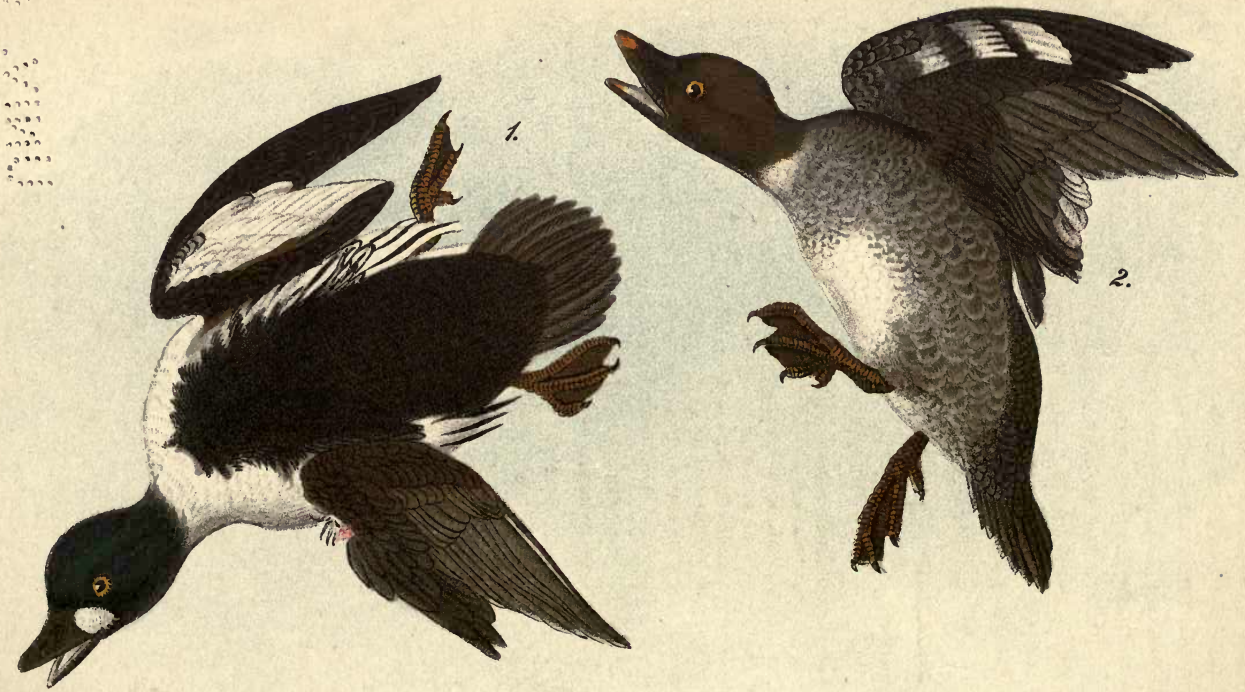
Melospiza lincolni (AUD.).

Lincoln's Sparrow.

DESCRIPTION.

A little smaller than the Song Sparrow; top of head brown, sharply streaked with black, and divided in middle by a grayish stripe; grayish lines from maxilla over eyes to occiput; above grayish-olive, rather thickly and sharply streaked with black; belly white and unmarked; a broad band across breast, and also sides in some specimens buff or yellowish with numerous small lengthened streaks of black; tail feathers brownish with blackish shafts.

Habitat.—North America at large, breeding chiefly north of the United States and in the higher parts of the Rocky mountains; south in winter to Guatemala.



American Golden-eye.

1. Male; 2. Female.

Lincoln's Sparrow is found in Pennsylvania as a rather rare spring and fall migrant, frequenting shrubbery, brush piles, and weedy, briery thickets about streams and in swampy grounds. I have taken four specimens during the past ten years in eastern Pennsylvania; two early in May, one late in September, and the last early in October. Feeds on seeds and different kinds of insects. It is a quiet and secretive little bird, usually seen singly; only occasionally is it found in company with other species of sparrows, and if disturbed it seeks safety by hiding in the thick undergrowth rather than by flight.

Melospiza georgiana (Lath.).

Swamp Sparrow.

DESCRIPTION.

Size a little smaller than Song Sparrow; crown bright chestnut; forehead black; back broadly streaked with black, and most feathers of back edged with brownish; upper surface of wings and tail *decidedly* rusty; belly white; sides, flanks and tibiæ brownish; chest and line over eye grayish; the lower anterior parts are usually without streaks or spots; throat whitish with sometimes indistinct blackish streaks.

Habitat.—Eastern North America to the plains, accidentally to Utah, north to British provinces, including Newfoundland and Labrador. Breeds from Northern States northward, and winters in the Middle States and southward.

The Swamp Sparrow is retiring in its habits, and, as the name would indicate, it is a common frequenter of grassy, weedy and bushy swamps; it is also often found about the edges of streams and ponds where weeds and grasses grow in abundance. I have never found the nest of this species, but from reports received from various naturalists and collectors it appears that it breeds sparingly in nearly all parts of the state. The Swamp Sparrow occurs as a tolerably frequent winter resident in swampy thickets in the southern counties of Pennsylvania. The nest and eggs of this bird, as described by different writers, are very similar to those of the Song Sparrow. The food is similar to that of other birds of the genus *Melospiza*.

Genus PASSERELLA Swainson.

Passerella iliaca (Merr.).

Fox Sparrow.

DESCRIPTION (*Plate 31. Fig. 3.*)

Upper mandible dark, lower chiefly yellow; legs brown. Readily distinguished by its rusty red or ferruginous colors, brightest on the wings, rump and tail; below white; upper part of breast, sides of throat and body with triangular rusty spots, darkest and most conspicuous on middle of upper part of chest; tips of middle and greater coverts forming two whitish wing bars. Length about 7½ inches; extent about 11½.

Habitat.—Eastern North America, west to the plains and Alaska (valley of the Yukon to the Pacific), and from the Arctic coast south to the Gulf States. Breeds north of the United States; winters chiefly south of the Potomac and Ohio rivers.

The summer home of this large and rusty-coated sparrow is in the dreary wilds of British America, from Labrador to Alaska. Their nests, we are reliably informed, have never been obtained in the United States, where these birds occur only during the spring, fall and winter months. With us this species is found as a common migrant in March, April, October and November. Occasionally only are small parties, or straggling birds, met with during mild winters in our southern counties. While sojourning here they may be observed in flocks, of from eight to twenty each, inhabiting humid grounds in bushy places along the roadside, the edges of woods, banks of streams, ponds, etc., where they diligently ply themselves in searching among the fallen leaves, dead wood and decaying grasses for seeds and insects.

GENUS **PIPILO** VIEILLOT.

Pipilo erythrophthalmus (LINN.).

Towhee; Bush-bird.

DESCRIPTION (*Plate 95*).

Bill large and stout; eyes red (adult) and yellowish in young; bill black; legs brown.

Male.—Belly, lower part of breast and patches on outer three or four pairs of tail feathers, basal portion of primaries and outer webs of same, white; head, neck, chest, back and rest of tail black; sides, flanks and crissum chestnut and brownish. Female same as male but black replaced by brown. Length about 8½ inches; extent about 12 inches.

Habitat.—Eastern United States and southern Canada, west to the plains.

Common summer resident from April to November; rare winter resident in the southern counties, where a few individuals are occasionally seen. This somewhat shy and retiring bird inhabits thickets, clearings and woodland undergrowth; during migrations it also often visits lawns and gardens of towns and villages. When migrating southward these birds go in small detached flocks; in the spring they come singly or in pairs, the males arriving usually a few days in advance of the females. The rather bulky nest, made up of leaves, fine twigs, grasses, etc., is generally built on the ground in a grass tuft or at the base of thick bushes, and so artfully is it hidden that it can oftentimes only be discovered by a most careful search. The four or five white and reddish spotted eggs measure each about .95 by .72 of an inch. The several terms, Towhee, Chewink, Juree and Shewink, by which this bird is known, are applied in imitation of its sharp, quick and rather petulant cry. From its terrestial habits and conspicuous chestnut-colored sides, has arisen the name of Ground Robin, which, although much less appropriate than any of those previously mentioned, is, nevertheless, the one by which it is best known in eastern Pennsylvania. The Towhee, an indefatigable seed and insect hunter, spends most of his time on the

ground, in thickets and brush piles, hunting among the withered leaves and dead twigs. Its rustling scratch is often the only indication one will have of its presence. In addition to various small seeds and insects, Chewinks feed, also, more or less, in the late summer, autumn and winter, on different kinds of small fruits and berries. Occasionally, it is said, they visit potato vines and other plants on which the destructive Colorado potato-beetle feeds, and devour many of these troublesome "bugs."

GENUS CARDINALIS BONAPARTE.

Cardinalis cardinalis (LINN.).

Cardinal; Red-bird.

DESCRIPTION (*Plate 34*).

Young.—Bill blackish; colors duller; otherwise very similar to adult female. The young male soon attains his bright coat. Length about 9 inches; extent about 12.

Habitat.—Eastern United States, north to New Jersey and the Ohio valley (casually farther) west to the plains.

The Cardinal, or Winter Red-bird, as it is generally called, is a rather plentiful resident in the lower half of Pennsylvania, but in other sections of our state it is found chiefly as a rare or occasional visitor. The showy dress, the fine and varied vocal powers of this shy and vivacious whistler, are such that it is one of our most common and entertaining cage birds. Although usually found inhabiting briery thickets and wooded districts in the vicinage of rivers, ponds and swampy localities, these birds, mostly in winter, when pressed by hunger, and also occasionally in summer, when in a measure they lack their usual vigilance and shyness, come about our yards, houses and barns in search of food, or to cheer and enliven us with their bright presence and pleasing notes. In the southern states and elsewhere where Red-birds are much more numerous than in Pennsylvania, they at times assemble in large companies during the winter in swampy thickets; in midwinter, with us, parties of a dozen or fifteen individuals are sometimes observed in similar situations. This species is generally seen in pairs, though in the late summer and fall the adults and young of the year of a single family are frequently found together. The nest, a loosely-built structure composed of twigs, weed stems, fibers of grape-vine bark, grasses or other vegetable materials, is built in bushes, vines and low trees. I have never found a nest situated over six or eight feet from the ground. The eggs, two to four in number (usually three), are white or bluish-white, spotted with different shades of brown. They measure about one inch in length by three-fourths of an inch in width. Feeds on seeds of numerous plants, especially those of rank weeds and grasses; corn, wheat, rye and oats are also eaten. They feed more or less on insects, chief among which are beetles, grass-

hoppers, crickets, ants, flies and numerous larval forms. Fruits of the cedar and mulberry trees, also strawberries, blackberries, raspberries, wild grapes and other small fruits may be included among their favorite articles of diet. This bird, with its large and powerful bill, operated by strong muscles of its head, can readily break into fragments the hard grains of maize, as well as the large seeds of different kinds on which it subsists. Its known ability in this particular has earned for it, in some places, the local name of Red Corncracker.

Genus **HABIA** Reichenbach.

Habia ludoviciana (Linn.).

Rose-breasted Grosbeak; Potato-bug bird.

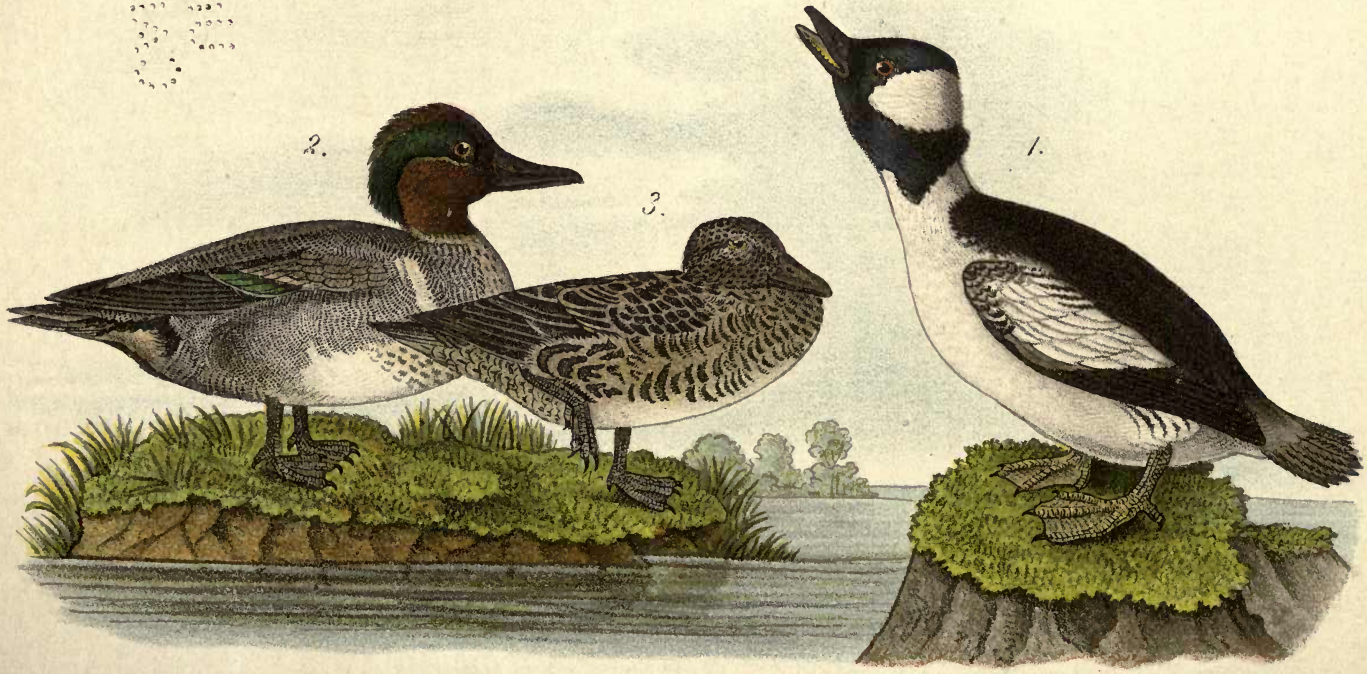
Description (*Plate 35, adults and young*).

Length about 8 inches; extent about 13 inches. Young males in late summer and fall have rose and red markings on breast, and under wing-coverts more or less distinct. The female has lining of wings and axillaries saffron yellow.

Habitat.—Eastern United States and southern Canada, west to the eastern border of the plains; in winter, to Cuba, Central America and northern South America.

In eastern Pennsylvania the Rose-breasted Grosbeak is found as a regular, though usually not a common, visitant during migrations in May and September, when this species is mostly seen in small parties of from five to a dozen each. In the spring, while passing northward (they breed for the most part north of Pennsylvania), the males arrive nearly a week in advance of the females, but in the fall both sexes, according to my observation, migrate together. Mr. Benj. M. Everhart, of West Chester, says that twenty-five years ago this species was a rather common summer resident in Chester and Delaware counties, where he has repeatedly found their nests, eggs and young. In both of these districts the Rose-breasts are now rarely found in the summer time. Although these bright-colored* and sweet-voiced songsters have apparently abandoned most of their summering resorts, in our eastern districts, many of their number find a congenial summer abode in the western and northwestern parts of our state, particularly in Crawford and Erie counties, where, my highly esteemed friend, Mr. Geo. B. Sennett, assures me, these birds are regular and rather plentiful summer residents, nesting in low trees and bushes. The nest is a thin, flattened structure, made up of rootlets, small twigs and dried grasses; the dull greenish-white eggs, spotted with brown, are three or four in number and measured about one inch by three-fourths of an inch. These birds, while sojourning here, frequent chiefly groves and forests; apple orchards and gardens are also sometimes visited by them. It is said that in some sections of Crawford

* Two or three years are, it is said, required before the males acquire their full beauty, and it is also stated that the adult males in the late summer and fall lose much of their black and become more or less streaked with brownish tints.



1. Buffle-head. *Male.*

2, 3. Green-winged Teal. *Male and Female.*

county where this species resides in summer, many farmers protect them because they are great destroyers of "potato bugs." A gentleman residing, I think, near Meadville, stated at a recent meeting of our State Board, that he had often seen these birds in small flocks about his potato patch, eagerly devouring large numbers of these vexatious insects. Few, if any, of our birds are known to feed regularly on the Colorado potato-beetle, and as the Rose-breasted Grosbeak has developed a taste in this direction, it should justly rank as one of the best feathered friends of the farmer. My personal knowledge of the food-habits of this species is limited to examinations made in May, 1882, when these birds were, to my great surprise, exceedingly abundant in the woods throughout various parts of Chester, Lancaster, Franklin, Adams, Delaware and Philadelphia counties. All the birds examined by me were shot in woods, feeding mostly on hickory and beech trees, in the neighborhood of West Chester, Penna. May 11, six males, on hickory trees, food consisted entirely of blossoms. May 12, thirteen birds, eight males, three on hickory trees, others on beech trees. All showed blossoms; two contained blossoms of the hickory, with those of the beech; the remainder had all fed on beech blossoms, except three birds, which had in their gizzards small black seeds and some few flat grayish seeds. May 13, eleven birds, seven males, all contained blossoms of beech, in addition to which, two males revealed remains of beetles and one of them had also eaten a few flies. May 15, eleven birds, ten males, three taken on beech and maple trees, had only fed on blossoms; the others were found, when first discovered, feeding on the ground in the woods; the stomach of one contained simply fragments of a beetle, the rest had eaten blossoms and small seeds. May 16, three males, food exclusively blossoms. May 17, four birds, three females, chiefly blossoms and small seeds, with few larvæ, and fragments of beetles. May 19, two birds; male, beech blossoms; female had in her gizzard, blossoms, remains of beetles and several wasps. May 20, 23 to 27, inclusive, eleven birds, nine females; two males taken on the 20th had fed chiefly on beetles and a few flat cylindrical seeds; the remaining nine specimens were shot on various dates, the last being taken on the 27th, when they were found to be very scarce. An examination of their viscera showed that in addition to blossoms and small seeds, they all had fed to a small extent on insects, chiefly beetles and flies.

Genus **GUIRACA** Swainson.

Guiraca cærulea (Linn.).

Blue Grosbeak.

Description.

Bill large and stout like other Grosbeaks; bill dark-bluish black; legs and feet similar; male blue; brightest on head and darker across middle of back; feathers about base of bill, lores, wings and tail blackish; middle and greater wing-coverts

have reddish-brown tips. Female brownish-yellow, below rather paler than above, wings and tail dusky-brown, with, sometimes, faint traces of blue; two brownish-wing bands. Young similar to female. Length about 7¼; extent about 11½; female smaller.

Habitat.—Southern half of the United States, from the Atlantic to the Pacific, south into Mexico.

The Blue Grosbeak is a very rare and occasional summer resident in southern counties of Pennsylvania. About five years ago, May 10, I captured one of these birds in the lower part of Chester county; it is the only one of the species I have ever seen in the state. The Messrs. Baird writing, in 1844, of the Blue Grosbeak, give it as a native and say: "A few seen each year in the same place" (in the vicinity of Carlisle, Cumberland county). During recent years, however, according to the report of Mr. T. L. Neff, of Carlisle, this species has not been observed. Dr. Turnbull (1869) includes it in his list of rare and irregular summer visitants in the southern counties of Pennsylvania. Dr. Spencer Trotter* mentions the capture of stragglers in Philadelphia and Delaware counties. The late Judge Libhart recorded it as a "very rare" visitor in Lancaster county, where Prof. H. J. Roddy informs me it has in recent years been found as a casual summer resident. In the summer of 1884 Mr. W. H. Buller captured a specimen near his home at Marietta. Mr. J. F. Kocher writes me that some few years ago he found a nest with eggs of this species in Lehigh county. Dr. John W. Detwiller, who has devoted careful study to our feathered fauna for the past twenty-five years, shot a Blue Grosbeak in the spring near Easton, Northampton county; it is the only one he ever met with in the state. Messrs. George Miller and Casper Loucks have observed stragglers of this species in York county. "Nest, in bushes, vines or other shrubbery, sometimes a low tree, of grasses and rootlets; eggs, four to five, averaging .90 by .65, palest-bluish, normally unspotted; quite like those of the Indigo-bird, but larger."—*Coues.*

Genus **PASSERINA** Vieillot.

Passerina cyanea (Linn.).

Indigo Bunting; Green-bird; Indigo-bird.

Description (*Plate 36*).

Length about 5½ inches; extent about 8½ inches.

Habitat.—Eastern United States, south in winter to Veragua.

Very abundant from May to October. When they first come, and also in the autumn before leaving, these birds are sometimes seen in small flocks. The males arrive a few days before the females, and in small parties often visit our gardens and orchards, where, in the spring, they are frequently to be observed gleaning insects, or devouring the apple-

* Bull. Nutt. Orn. Club, IV. 1879, p. 235.

1.

2.

1. Purple Grackle. 2. Bronzed Grackle.

Males.

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tree blossoms. These birds, although found in almost every locality, are most numerous in briery thickets, open woodland and in bushy places along fences and roadways. The nest, composed of leaves, dried grasses, etc, is built in low bushes. The eggs are four or five, bluish-white and unspotted; seldom are they pure white, and rarely do we find them spotted or thinly dotted with reddish-brown, but whatever may be their coloration, they measure a little less than three-fourths of an inch long, and a trifle over one-half inch wide. The female with her plain brown dress, not unlike some members of the human race when attired in "mother-hubbards" and calico gowns, always shy and retiring—seems ever anxious to elude observation. The male, however, in his attractive and showy garb of iridescent blues, seemingly is conscious of his beauty, and appears eager to make his presence known. He perches on the tops of high bushes, on the dead twigs and limbs of tall trees, on the telegraph wires and fences, to sing his peculiarly vigorous and rapid song. The sharp *tship* of the female never, however, fails to quickly call to her side, this vain, noisy yet most devoted partner. Indigo-birds feed chiefly on different kinds of small seeds; during the breeding season many insects are eaten. They subsist also to a small extent on apple and some few other blossoms; various kinds of small berries are not unpalatable to them.

GENUS SPIZA * BONAPARTE.

Spiza americana (GMEL.).

Black-throated Bunting; Dickcissel.

DESCRIPTION.

This species varies considerably in its markings; bill and feet grayish-black; length about 6¾ inches; extent about 11; female a little smaller; upper parts ashy and brownish, the most conspicuous on middle of back, where and also on the scapulars there are black streaks; top of head tinged with yellowish-green; line over eye, streak from mandible, breast and middle of belly, and edge of wing yellow; rest of lower parts white, except a black throat patch of variable size; wing-coverts bright chestnut; female similar but duller, and black throat patch usually absent or indistinct.

* *Spiza townsendii* (Aud.).

Townsend's Bunting. From Dr. Ezra Michener's Birds of Chester county published in 1881. I take the following remarks relative to this species, but one specimen of which has ever been taken, and it is now in collection of the Smithsonian Institute at Washington, D. C: "This unique bird was obtained by my excellent friend, whose name it bears, in a cedar grove near my dwelling, while assisting me in collecting birds in the spring of 1833. We at once pronounced it *new*. Audubon did the same, and named and published it in both of his large works. This curious bird has long been a puzzle to ornithologists in the uncertainty whether it is only a variety of *S. americana* (Black-throated Bunting) or a distinct species. Thus far (now more than forty years) but one specimen is known, kindly presented to the Smithsonian Institution by Dr. Michener. I do not feel able to decide the question of its true relationship to the *S. americana*. While this uncertainty remains it seems proper that Chester county should preserve a record of its history as a guide to future observers."

Sp. Ch.—"*Male.* Upper parts, head and neck all round, sides of body and fore part of breast, slate blue; the back and upper surface of wings tinged with yellowish-brown; the inter-scapular region streaked with black. A supercilliary and maxillary line, chin and throat, and central line of under parts from the breast to crissum, white; the edge of the wing, and a gloss on the breast and middle of belly, yellow. A black spotted line from the lower corner of the ower mandible down the side of the throat, connecting with a crescent of streaks in the upper edge of the slate portion of the breast. Length 5¾ inches; alar extent 9; wing 2.86; tail 2.56 inches."—*S. F. Baird.*

Habitat.—Eastern United States (chiefly west of the Alleghanies), west to the Rocky mountains, north to Massachusetts, New York, Wisconsin and Minnesota, and south in winter through Central America to northern South America.

Tolerably common summer resident from May until about 1st of September in some sections of the southeastern, southern and western counties of Pennsylvania; rare, or at least not reported to occur, in the northern counties or the mountainous regions of the state. The nest, of weeds, grasses, etc., is usually placed near the ground in weeds or bushes; eggs, four or five in number, are pale blue; they measure about .80 by .60. The Dickcissel feeds on seeds and sometimes on small berries, and in the summer he destroys numerous kinds of insects.

FAMILY **TANAGRIDÆ.** TANAGERS.

GENUS **PIRANGA** VIEILLOT.

Piranga erythromelas VIEILL.

Scarlet Tanager; Black-winged Red-bird.

DESCRIPTION (*Plate 37*).

Length about 7¼; extent about 12; wing about 3⅞; tail about 3 inches. Bill bluish or brownish-yellow; legs and feet lead color; iris brown.

Habitat.—Eastern United States, west to the plains, and north to southern Canada. In winter the West Indies, Central America and northern South America.

The Scarlet Tanager, one of the most brilliant of our forest birds, is about the size of the common bluebird. The wings and tail of the adult male are glossy black; body and other parts bright scarlet. The female is a greenish-yellow color, with wing and tail feathers dark brown. This description applies to full plumaged adults as we find them in the spring and early summer. Both sexes are, however, subject to great variations in plumage, and particularly is this variation noticeable in the male birds. It is stated that in the autumn the male loses its bright feathers and is found in a livery similar to that of the female. While I am not prepared to say that such a transition occurs during the "fall molt," I am inclined to believe that this change does take place. During the late summer months and early autumn, or for a period of about six weeks before the tanagers leave Pennsylvania, I have made repeated and most diligent search to find adult males in which the scarlet feathers predominated, as is invariably the case with the males in spring, but have failed. Although it is true I have seen two or three males early in August with a few scattered feathers or "patches" of scarlet, I have found the plumage of the males, late in August and in September, to be the same as that of the females, except that in the males certain of the long wing and tail feathers were black. The presence of these dark primaries or tail feathers will, it is my opinion, with rare exceptions, enable you to determine the sex.*

*The only proper way to determine the sex is by dissection. This is true not only of the Tanager, but all other birds.

This species arrives in Pennsylvania sometimes, though rarely, as early as the last week in April; usually it comes about May 9. Tanagers, except when they pay occasional visits to cherry or mulberry trees, on the fruits of which they feed to a limited extent, are seldom found away from favorite retreats in the forests. The forests and groves, particulary oak groves, in which streams of water are found, are the favorite resorts of this species. The nest, a loosely built structure, composed of twigs, roots or stems of various weeds, is usually placed on the horizontal limb of a small tree, preferably beech (*Fagus*), about ten or twenty feet from the ground. Eggs, three to five, mostly four, pale greenish-blue, spotted with different shades of brown, measure about .95 by .65. While the nests are nearly always built in the depths of the woods, I have observed they frequently are seen overhanging a cart-road or unfrequented path, when such a passage-way exists in the woods. I have often discovered the nests of this species, and, notwithstanding the fact that neither the nests or contents were disturbed, have noticed that the birds would always follow me to the edge of the woods, and occasionally some distance beyond, uttering their peculiar *chirp churr*. When tanagers thus absent themselves from the nests, it not unfrequently happens that the thieving and omnivorous Blue Jay robs them of their contents. Mr. B. M. Everhart has known instances where the jays, after devouring the eggs or young tanagers, have torn up the nests.

Tanagers, during the summer residence with us, feed principally on various forms of insects, and to a very small extent on fruits, such as cherries, strawberries, huckleberries, etc.

The stomach contents of twenty-nine of these birds are given in the following table:

No.	Date.	Locality.	Food-Materials.
1	May 6, 1880, .	East Bradford, Pa., . .	Beetles.*
2	May 17, 1880, .	East Bradford, Pa., . .	Beetles.*
3	May 18, 1880, .	East Bradford, Pa., . .	Beetles (on maple tree).
4	May 19, 1880, .	East Bradford, Pa., . .	Beetles.*
5	May 19, 1880, .	East Bradford, Pa., . .	Beetles.*
6	Sept. 15, 1880, .	West Chester, Pa., . .	Grasshoppers.
7	May 20, 1882, .	East Bradford, Pa., . .	Beetles and spiders.*
8	May 20, 1882, .	East Bradford, Pa., . .	Beetles and spiders.*
9	May 20, 1882, .	East Bradford, Pa., . .	Beetles and flies.*
10	May 20, 1882, .	East Bradford, Pa., . .	Beetles and spiders.*
11	May 20, 1882, .	East Bradford, Pa., . .	Beetles and flies.*
12	May 12, 1883, .	East Bradford, Pa., . .	Few flies and small worms (taken on cherry tree).
13	May 12, 1883, .	East Bradford, Pa., . .	Beetles (taken on maple tree).
14	May 14, 1883, .	Chester county, Pa., .	Beetles, flies and few small green worms (on oak tree.)
15	May 14, 1883, .	Chester county, Pa., .	Beetles chiefly, with traces of other insects.*
16	May 14, 1883, .	Chester county, Pa., .	Beetles.*
17	May 14, 1883, .	Chester county, Pa., .	Beetles.*
18	May 14, 1883, .	Chester county, Pa., .	Beetles.*
19	May 25, 1883, .	West Goshen, Pa., . . .	Black beetles and other insects (taken on walnut tree).
20	May 25, 1883, .	Willistown, Pa., ...	Flies and beetles.*
21	May 25, 1883, .	Willistown, Pa., ...	Flies and beetles.*
22	May 7, 1883, .	Chester county, Pa., .	Beetles and flies.
23	May 7, 1883, .	Chester county, Pa. .	Beetles and flies.
24	June 4, 1884, .	Chester county, Pa., .	Beetles and other insects.
25	June 4, 1884, .	Chester county, Pa., .	Unrecognizable insect mass.
26	June 14, 1884, .	Chester county, Pa., .	Cherries.
27	June 14, 1884, .	Chester county, Pa., .	Cherries.
28	June 17, 1884, .	Chester county, Pa., .	Beetles, flies and butterfly.
29	June 17, 1884, .	Chester county, Pa., .	Beetles and other insects.

* All taken on hickory trees.

May 18, 1882, I shot seven adult males feeding in oak (*Quercus*) and hickory (*Carya*) trees, and found all to have fed exclusively on coleopterous insects (*beetles*). On May 13, 1883, I killed thirteen tanagers, twelve being adult males, in a large woods on the property of William Williams Jr., Willistown, Pa. The birds were all shot in the forenoon and while feeding in the maple (*Acer*) and hickory (*Carya*) trees. An examination of the stomachs of this series of birds, made by myself and Mr. Williams, showed that black-colored beetles and no other food had been taken.

Piranga rubra (LINN.).

Summer Tanager.

DESCRIPTION.

Is a trifle larger than the Scarlet Tanager. The *adult male* is a "rose-red" or vermilion color; wings and tail feathers are same color as body (unexposed portions of wing feathers, also ends of primaries and secondaries, dusky); *adult female* is greenish or brownish-olive above, lower parts lighter. This bird, like the Scarlet Tanager, is subject to great variations in plumage.

Habitat.—Eastern United States, north regularly to southern New Jersey, Ohio, Illinois, etc., casually north to Connecticut and Ontario, etc., and accidentally to Nova Scotia. In winter south to Cuba, Central America, etc.

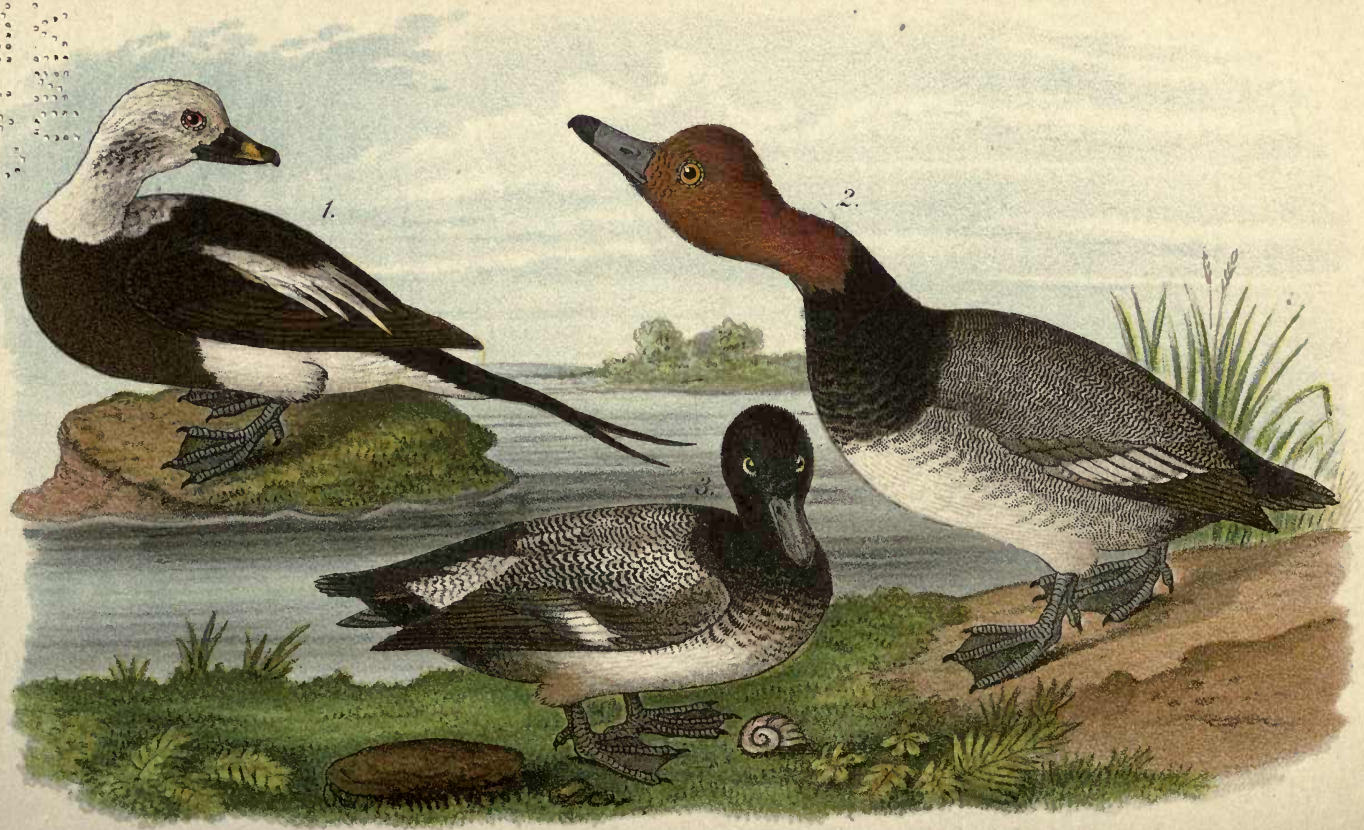
The Summer Tanager is a very rare and irregular summer visitor in Pennsylvania. May 25, 1876, I saw a pair of these birds, and October 10, 1889, I saw a female, all in West Chester. Early in April these tanagers arrive in Florida from their wintering resorts in the tropics. Food similar to that of the Scarlet Tanager.

FAMILY **HIRUNDINIDÆ**. SWALLOWS.

THE SWALLOWS.

Swallows feed exclusively* on insects. They consume myriads of flies which so pester our horses and cattle, or sorely vex the tidy housewife. They have a lively and not unmusical twitter, but no song. Swallows are remarkable for their sociability at all times; they migrate in flocks, sometimes numbering thousands, and nest together often in large companies. Living as they do almost constantly on the wing, they visit nearly every locality, generally, however, when feeding and migrating, they frequent mostly ponds, rivers, streams and watery places in fields and meadows, where various kinds of winged insects are so plentiful. They frequently are seen to stop for an instant to drink and bathe when skimming over the water's surface. In clear weather these birds often ascend to high elevations in the air, but in dull weather, particularly before rains, they fly low and sail close to the ground. With the exception of two species, all our swallows lay pure white and unspotted eggs. The eggs of these two species, the Cliff and Barn Swallows—are white, speckled or spotted with reddish-brown, and so alike are the eggs of these two birds, that they cannot with absolute certainty be distinguished apart. The usual complement of eggs of each of our species is five, sometimes six, but very seldom do we

* In two instances I have found in the stomachs of Tree Swallows a few seeds, apparently of berries; possibly this species sometimes feeds on small fruits.



1. Old-Squaw. 2. Redhead. 3. Lesser Scaup-Duck.

Males.

and three or a less number deposited when incubation is begun. The Purple Martin builds a nest of hay, straw, leaves, feathers, etc., in boxes provided for them about houses and buildings; occasionally with us this species breeds in holes in trees. Its eggs average a little under one inch in length, and about three-fourths or a little less in width. The Barn Swallow nests mostly in the interior of barns, where, on a beam or rafter, near the top of the roof, it builds a large bowl-shaped nest (not covered over the top as is the Cliff Swallow's) of mud, grasses and feathers. The mud used to cover the exterior, and in fact make up the greater part of the nest, is collected by the birds, along the edges of streams, ponds and in muddy places in fields and roads, and conveyed in small rounded masses on the top of the upper mandible. The eggs measure about .77 long by .55 of an inch wide. The Cliff Swallow with us nests under the eaves of barns and other out-buildings. It never, I think, in this state breeds about rocks or cliffs, as it does in uninhabited regions. The nest is built of small mud pellets, warmly lined with feathers or other soft materials, and in this region is hemispherical in shape, with a small hole in front or on the side, or sometimes, but not usually, I think, retort-shaped or bottle-like in appearance, with the opening built out, often several inches from the body of the nest. The eggs are very similar in size to the those of the Barn Swallow, from which they are said to differ in being less elongated. The Bank and Rough-winged Swallows excavate holes in sand banks, along streams, deep railroad cuts, wagon roads, etc., in which they build loosely made nests of grasses and feathers. The Rough-winged, with us breeds usually in the interstices of stone abutments of bridges or in the holes of old stone barns or similar structures. The eggs of this last named species are possibly a trifle larger than those of the Bank Swallow, which measure about .70 long and about .50 of an inch in width. The Tree Swallow builds in holes of trees and stumps, or in bird boxes. The nest is similar to those made by Bank and Rough-winged Swallows. Its eggs are about the same size as those of the Rough-winged species.

"Primaries nine. Bill triangular, depressed, about as wide at base as long; the gape twice as long as culmen, reaching to about opposite the eyes; tomia straight or gently curved; no obvious rictal bristles. Tarsi not longer than the lateral toe and claw. Wings long and pointed, the first primary equal to or longer than second. Middle tail feathers not half as long as the wing."

GENUS **PROGNE** BOIE.

Progne subis (LINN.).

Purple Martin.

DESCRIPTION (*Plate 58*).

Length 8; extent 16 inches; bill black, mouth inside yellow; eyes brown; legs dark brown; closed wings, extend beyond the tail which is decidedly forked.

Adult male.—Glossy blue-black; wings and tail feathers above black, more or less glossed with blue-black; under portions of wings and tail feathers dark-brown.

Adult female.—Dull-brown above, glossed with blue-black, brightest on back of head and middle of back; loral spaces and auricular feathers dark-brown or black; forehead, and narrow stripe about hind neck, grayish-white; belly and under tail-coverts white; rest of under parts dull grayish-white, darkest on the sides.

Young.—Both sexes quite similar to female, though the males are mostly darker. Immature males, with blue-black feathers singly or in patches, are common. About three years, it is believed, are required for the male to attain his full dress.

Habitat.—Temperate North America, south to Mexico.

Common resident from early in April to about the middle of August; they arrive in spring, singly, in pairs or small flocks. Late in August

these birds collect in flocks (numbering sometimes several hundred each), which for a brief period linger about meadows along rivers or other large bodies of water, and then wend their way southward. Since the advent of the prolific English Sparrow, martins have abandoned many of their nesting-places in towns and cities. Dr. John R. Everhart, of West Chester, Pa., appreciating that his flock of chattering martins was rapidly diminishing before the advances of the sparrows, some few years ago erected in his yard a large pole with cross-pieces, from which were suspended, by brass wire chains, each about eighteen inches long, a number of boxes, in which the martins, also wrens and bluebirds, nest without any trouble from their common feathered enemy The swaying motion of these pendant boxes appears to frighten the sparrows, as not one has ever been observed to alight on or enter them.

"The martin differs from all the rest of our swallows in the particular prey which he selects. Wasps, bees, beetles, particularly those called by boys *Goldsmiths*, seem his favorite game. I have taken four of these large beetles from the stomach of a Purple Martin, each of which seemed entire, and even unbruised."—*Wilson.*

Genus **PETROCHELIDON** Cabanis.

Petrochelidon lunifrons (Say.).

Cliff Swallow.

Description (*Plate 54, adults and nests*).

Length about 5½; extent about 12 inches; tail nearly even or very slightly forked; bill black; legs and eyes brown; top and back of head, back and a spot on throat lustrous blue-black; wings and tail blackish, slightly glossed; grayish-brown band on hind neck; forehead white or light-brown; chin, throat and sides of head dark chestnut, rump same, but lighter; breast brownish-yellow, whitening on the belly. Sexes similar; the young, although generally duller in colors, greatly resemble the adults.

Habitat.—North America at large, and south to Brazil and Paraguay.

Common summer resident; generally distributed throughout the state. Breeds mostly in colonies of from twenty to forty individuals; sometimes, however, as many as fifty or seventy-five nests are found together. Although I have known these birds to breed, for three consecutive seasons, under the eaves of long sheds in a cow-yard, I am inclined to think that they usually breed but one season in the same place. The Cliff Swallow arrives here about the last week in April and disappears early in September. This bird when flying can easily be distinguished from other swallows by its almost even tail feathers and the conspicuous rusty-colored rump. During migrations this species is found in greatest numbers in the vicinity of rivers, ponds and lakes.

I am indebted to Dr. H. D. Moore, of Somerset county, for the following interesting letter relative to nest building of the Cliff Swallow

(*Petrochelidon lunifrons*) in Pennsylvania in December: "New Lexington, Pa., January 1, 1890.— * * * I wrote you on the 28th ult. that it was reported to me that the Cliff Swallows were building at a farmer's barn some six miles away. I investigated the matter by going there myself to see if the report was correct. I saw the nest, but the swallows had gone on last Saturday, probably driven away by the sparrows. The farmer, John Shaff, and his daughter told me that they first noticed the birds on the 23d of December, and they were already building. They commenced to build on the foundations of old nests. They had one nest completed and two others partly done. During all last week the temperature never ranged below 40° nor above 65°. In an open winter like this one it may not be unusual, in some parts of the state, for swallows to make their appearance in midwinter; but, as far as I can learn, they were never seen here before in December. * * * I have often seen nests with the opening from three to five inches long. Sometimes this neck is fastened to the ceiling in a horizontal line, and at other times it is curved slightly downward."

GENUS **CHELIDON** FORSTER.

Chelidon erythrogaster (BODD.).

Barn Swallow.

DESCRIPTION (*Plate 54, adults and nest*).

Length about 6¾ inches; extent about 12½ inches; bill and nails black; eyes very dark brown; legs and feet light brown; above glossy steel-blue, with concealed white on middle of back; wings and tail feathers viewed from above blackish, glossed with greenish and violet hues; tail very deeply forked; inner webs of all tail feathers, except two middle ones, have showy white spots; outer tail feathers much longer and narrower towards the ends than others; imperfect steel-blue color on upper part of breast; forehead, chin, throat and a space on under tail-coverts, deep chestnut; rest of lower parts lighter reddish-brown.

Young.—Duller and paler than the adults; and the lateral pair of tail feathers are also much shorter.

Habitat.—North America in general, from the Fur countries southward to the West Indies, Central America and South America.

The Barn Swallow is so named because it usually nests in barns. This bird, like the preceding species, arrives here late in April and departs about September 1. This swallow, either when at rest or on the wing, may be recognized by its deeply-forked tail, which, if viewed from below, shows a broad white band, most conspicuous when the bird is flying.

Genus TACHYCINETA Cabains.

Tachycineta bicolor (Vieill.).

Tree Swallow; White-bellied Swallow.

Description (*Plate 38*).

Length about 6 inches; extent about 13 inches; tail slightly forked; bill black; legs and iris brown; lores black; above glossy metallic-green; wings and tail blackish, with faint greenish gloss; lower parts entirely white.

Young, colors are duller and toes somewhat yellowish.

Habitat.—North America at large, from the Fur countries southward, in winter, to the West Indies and Central America.

The Tree Swallow, when flying or at rest, can easily be distinguished from all other of our swallows by its dark-colored back and pure white under parts. This species arrives here late in March or early in April, and leaves in September. Common and very generally distributed during migrations; as a summer resident seems to be most frequent about rivers and other large bodies of water. From numerous reports before me it is learned that this swallow breeds more or less regularly and rather sparingly in nearly every county in the state. Referring to this bird in Lycoming county, my friend Prof. A. Kock writes in a letter of recent date substantially as follows: It used to breed readily in boxes, but not since the sparrow nuisance has been introduced from England. Have observed the female Tree Swallow enter the dry limbs of high trees (buttonwood) on our river islands. Think we have more some years than others.

Genus CLIVICOLA Forster.

Clivicola riparia (Linn.).

Bank Swallow; Sand Swallow.

Description (*Plate 90*).

Smallest of all our swallows; length about 5, extent about 12½ inches; bill black; legs brownish; iris dark-brown; tail short and slightly forked; lower part of tarsus feathered behind; above grayish-brown; beneath white, with a broad band across the breast, same color as on back; wings and tail dark brown.

Habitat.—Northern hemisphere; in America, south to the West Indies, Central America and northern South America.

Common summer resident at many points along Delaware, Susquehanna and other large streams.

GENUS **STELGIDOPTERYX** BAIRD.

Stelgidopteryx serripennis (AUD.).

Rough-winged Swallow.

DESCRIPTION.

Rather larger than the last; bill, legs and eyes same color as the Bank Swallow; above grayish-brown; lower parts similar, though paler, gradually whitening on the belly; edge of first primary rough to the touch, by the outer web being converted into a series of stiff recurved hooks. The design of this peculiar wing structure is not clearly known. It has been suggested that these hooks "assist the birds in crawling into their holes, and in clinging to vertical or overhanging surfaces."—*Coues.*

Habitat.—United States at large (in the Eastern States north to Connecticut), south to Guatemala.

The Bank and Rough-winged Swallows arrive here about the first week in April and remain with us until about September 1. Both species frequent the same localities, being found generally in the neighborhood of rivers, large creeks and mill-dams. These birds are not only alike in habit, but they also greatly resemble each other in size and colors. The Bank Swallow has a white throat and a dark band across the breast. The Rough-winged has a uniform mouse-colored throat and breast. These throat and breast markings will sometimes enable you to recognize the birds in life. Should you, however, desire to positively determine these two species, my advice would be, take your gun and shoot them. After doing this you will know the Bank Swallow by a tuft of feathers on the tarsus, near the insertion of the hind toe. An adult Rough-wing (particularly if an old male) has the first wing quills furnished with a number of saw-like hooks, from which originate the common name, likewise the technical one, *serripennis*, but as the immature Rough-winged Swallows lack these curious hooks, look at their legs—a Rough-winged Swallow has no feathers on the leg just above the hind toe.

FAMILY **AMPELIDÆ.** WAXWINGS.

THE WAXWINGS.*

Two birds of this family are found in Pennsylvania. The Cedar-bird is a common resident and occurs in all parts of the state, but the Bohemian Waxwing is a very rare and irregular visitor from the north, and is usually seen here only in excessively severe winters. Waxwings are nearly always observed in flocks. The sexes are alike; the tails are tipped with yellow. The wings are long and pointed; first quill very short; second and third longest; the under coverts extend almost to the end of the even tail; the wings and tips of some tail feathers in many individuals are often furnished with horny appendages, like red sealing wax; bill broad, short, wide at base, notched and slightly hooked at tip. Feet rather small and weak; three toes in front and one behind.

* Dr. Coues (Birds of Colorado Valley) referring to the "sealing-wax" appendages of the secondary quills of birds of this genus, says they "have been subjected to chemical and microscopical examination by L. Stieda, and shown to be the enlarged, hardened and peculiarly modified prolongation of the shaft itself of the feather, composed of central and peripheral substances, differing in the shape of the pigment cells, which contain abundance of red and yellow coloring matter."

SUBFAMILY **AMPELINÆ**. WAXWINGS.

GENUS **AMPELIS** LINNÆUS.

Ampelis garrulus LINN.

Bohemian Waxwing.

DESCRIPTION.

Length 7¾ inches; wing 4½; tail 2⅝. Bill (dried skin) bluish-black; legs black; general color ashy or grayish-brown, palest on rump, upper tail-coverts, breast and abdomen; forehead, a spot at base of lower jaw, and under tail-coverts brownish or chestnut; a narrow frontal line, chin and upper part of throat, and a showy streak starting in front and extending back of eye and meeting its fellow of opposite side, black; wings and tail feathers bluish-black; the tail quite blackish immediately in front of yellow tip; primary coverts and outer webs of secondaries have white tips (and in specimen before me also red wax-like appendages), outer webs of several primaries edged with white and yellow. Head with a conspicuous crest; feathers about vent white; *no* yellow on belly.

Habitat.—Northern parts of the Northern Hemisphere. In North America, south in winter, irregularly, to the northern United States.

Very rare and irregular winter vistor. I have a specimen which was captured some few years ago (midwinter) in a pine forest in the northern part of Elk county, where a flock of about twenty, it is stated, were seen. Stragglers of this species have also been taken at irregular intervals, during the past twenty-five years, and reported to me by the following named gentlemen: Dr. John W. Detwiller, Northampton county; Dr. W. Van Fleet, Clinton county; R. C. Wrenshall, Allegheny county; H. W. Williams, Lackawanna county, and H. J. Roddy, Lancaster county.

Ampelis cedrorum (VIEILL.).

Cedar Waxwing; Cedar-bird; Cherry-bird; Quaker-bird.

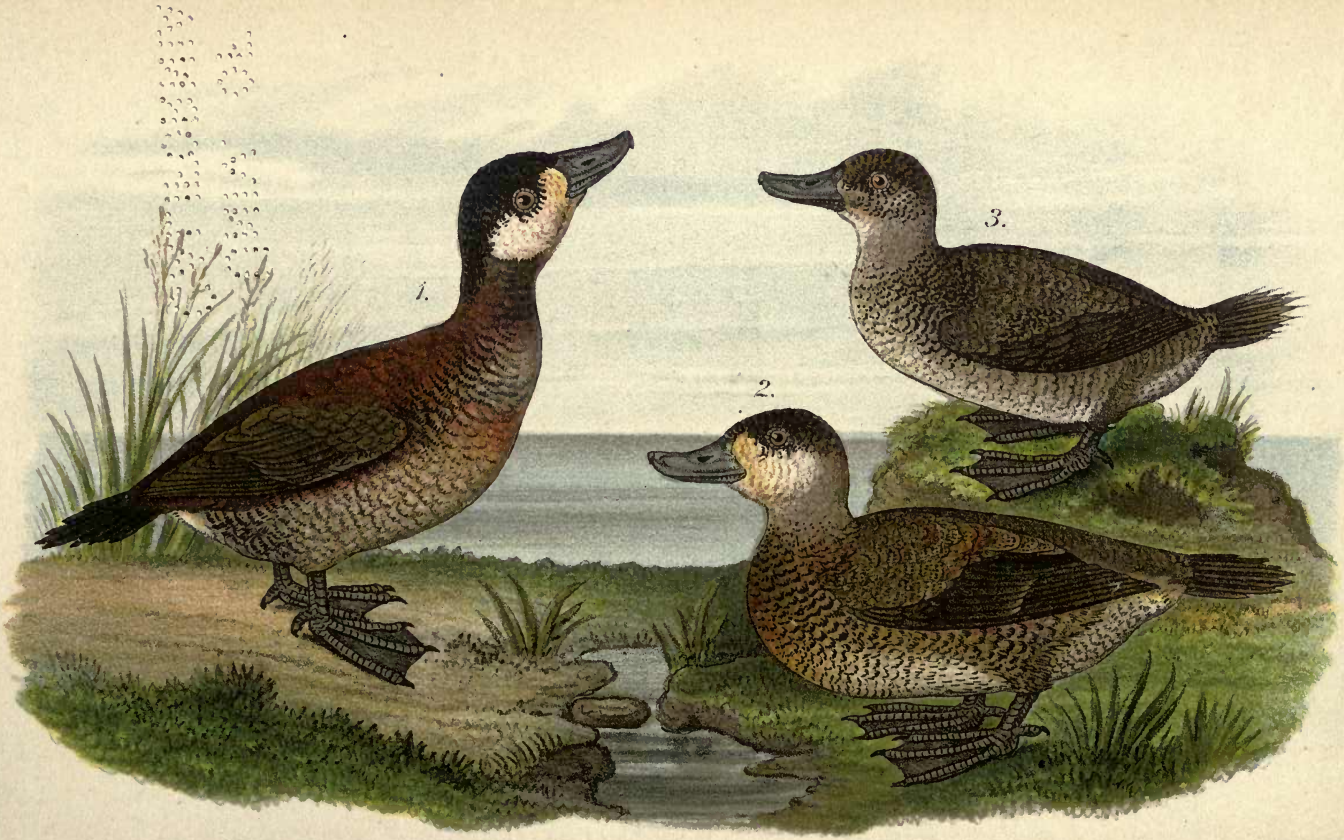
DESCRIPTION (*Plate 39*).

Length about 7¼ inches; extent about 12; wing under 4; tail 2¼; head crested; general color reddish-brown, deepest towards the front; rump and upper tail-coverts ashy; belly yellow; under tail-coverts white, and line of same on side of lower bill, between black of chin and the black line extending from behind and in front of eyes, and about base of maxilla; primaries and tail grayish lead color; tail tipped with yellow, and immediately back of this yellow the tail is almost black; the outer webs of several primaries have silvery edgings; no white or yellow spots on wings, but secondaries may or may not have red horny ends to the shafts.

Young duller than adults, and streaked with brownish, especially on breast and sides. Bill blue-black; legs black; iris brown.

Habitat.—North America at large, from Fur countries southward. In winter south to Guatemala and the West Indies.

The Cedar or Cherry-bird, as this species is best known in Pennsylvania, is an abundant resident. These birds, except in the breeding time (from about the last of June to the first of August), are always



Ruddy Duck.

1, 2. Males; 3. Female.

found in flocks, which in many sections seem most numerous in May and the first two weeks in June. The somewhat flat and rather bulky nest, composed of small twigs, roots, grasses, bits of string, feathers or other soft materials, is built in trees in groves and orchards, particularly apple orchards. The eggs, usually five in number, are dull bluish-gray spotted and blotched with black and brownish. They measure about .90 by .65 of an inch. Cedar-birds fly in compact flocks, and when they alight huddle close together on the limbs and twigs. They apparently prefer to light on dead branches of trees, and in the spring, or when they visit cherry trees, this habit is frequently taken advantage of by the observing farmer, who fastens to a long pole a dead branch, with numerous small twigs, and fixes it in the fruit tree so that the entire branch will project above the tree top, then stationing himself near by he can shoot the birds as they alight, without injuring, with shot, the tree or its ripening fruit. Some few years ago two farmers, residing near West Chester, killed one day in this manner over one hundred and fifty Cherry-birds, shooting from seven to twenty at each discharge. These birds, as their common names would signify, subsist chiefly on a fruit and berry diet; the many varieties of cultivated cherries, mulberries, whortleberries, wild grapes, berries of the gum, cedar and mountain ash, also the fruit of the poke plant, are its favorite food. In the spring they often visit orchards and gardens to feed on insects or devour portions of the apple blossoms. Cherry-birds are very expert flycatchers and they also destroy great numbers of caterpillars. Nuttall writing of this species says although a small portion of the gardener's cherry crop is destroyed "they fail not to assist in ridding his trees of more deadly enemies which infect them, and the small caterpillars, beetles and various insects now constitute their only food; and for hours at a time they may be seen feeding on the all-despoiling canker-worms, which infest our apple trees and elms. On these occasions, silent and sedate, after plentifully feeding, they sit dressing their feathers, in near contact on the same branch, to the number of five or six; and, as the season of selective attachment approaches, they may be observed pluming each other, and caressing with the most gentle fondness. This friendly trait is carried so far that an eye-witness assures me he has seen one among a row of these birds seated upon a branch dart after an insect and offer it to his associate when caught, who very disinterestedly passed it to the next; and, each delicately declining the offer, the morsel has proceeded backwards and forwards before it was appropriated."

FAMILY **LANIIDÆ**. SHRIKES.

THE SHRIKES.

Two species and one geographical "race" of this family occur in Pennsylvania. The Northern Shrike, although recorded by Dr. W. P. Turnbull and some few other observers as a summer resident "on the mountain ridges of the Alleghanies," does

not I am quite positive ever breed within our limits. It is found as a breeder in in North America beyond the northern United States. The Shrike, or Butcher-bird as it is usually called, which breeds here, and is common, especially in the northwestern part of the commonwealth, is the Loggerhead, that in many instances I have found is mistaken for *borealis*. The Northern Shrike, although occurring more or less regularly in all parts of the state in winter, is more numerous in the northern tier of counties, and in the mountainous regions than elsewhere. In Cameron, Potter, Elk and Susquehanna counties, this, the largest Butcher-bird—a rather plentiful winter visitor about orchards, fence-rows and fields—is termed by many "Little Gray Hawk." The name of Butcher-bird is given to the species because of the curious habit they have of impaling their prey on thorns or sharp-pointed twigs. They subsist mainly on large insects (beetles and grasshoppers), and they likewise devour small birds—particularly sparrows—mice and other small mammals. Butcher-birds are rather stout, heavy and hawk-like in appearance. While it is true that they kill a good many small wild birds, and even sometimes boldly attack cage-birds, they merit our protection as their dietary* is mainly made up of noxious insects; and the Northern Shrike, which devours more small birds than the others, kills many mice as well as insects, and he also preys considerably on English Sparrows. The bulky nest is generally built in thorny trees or bushes; eggs four to seven, dull white, spotted with light brown, purplish or olive. The eggs of *ludovicianus* measure .97 long by .72 wide, those of the variety *excubitorides* are about the same size, and the eggs of *borealis* are a little over 1 inch long by about ¾ wide.

"Bill very powerful, strong, and much compressed, the tip abruptly hooked, deeply notched, and with a prominent tooth behind the notch; both mandibles distinctly notched, the upper with a distinct tooth behind, the lower with the point bent up. Tarsi longer than the middle toe, strongly scutellate. Primaries, ten; 1st primary half the 2d, or shorter. Wings short, rounded; tail long and much graduated. Sides of tarsi with the plates divided on the outside." Bill and feet bluish black; eyes dark brown. Sexes are alike; the bill is less than an inch long. In some conditions of plumage it is impossible to distinguish the Loggerhead from the White-rumped.

Genus LANIUS Linnæus.

Lanius borealis Vieill.

Northern Shrike; Great Northern Shrike; Butcher-bird.

Description (*Plate 96*).

Length about 10½ inches; extent about 14; tail about 4¾; wing 4⅝; tarsus 1; above pale bluish-gray, whitening on upper tail-coverts and scapulars, and some specimens have upper parts faintly tinged with pale rusty; below whitish (sometimes tinged with pale brown), breast and sides "waved" with dusky or grayish lines; lores and a broad streak back of eye black; wings and tail blackish; the primaries are white from base to about half their length; nearly all tail feathers have white tips and outer webs of lateral ones are white.

Habitat.—Northern North America, south in the winter to the middle portions of the United States (Washington, D. C., Kentucky, Kansas, Colorado, Arizona, etc.).

The Northern Shrike is more common in the upper than the lower half of Pennsylvania, where it is as a winter resident from November to April, frequenting briery thickets, thorn hedges and grassy fields near

* In 1885 I collected a dozen or fifteen Loggerhead Shrikes in Florida, and two of them were stained about the face, with what appeared to be juices of mulberries or other soft fruit; possibly this species feeds sometimes on berries, etc.

trees and bushes. They sometimes visit towns and prey on English Sparrows. Shrikes feed chiefly on grasshoppers and beetles, and when these are not easily obtained they subsist on mice and small birds. The Northern Shrike, assassin-like, will conceal himself in bushes and imitate the cries of other birds, and when they come sufficiently near his ambush he will, to their great consternation, fly into their midst and seize one of their number.

Lanius ludovicianus Linn.

Loggerhead Shrike; Butcher-bird.

Description (*Plate 96*).

Length about 9; extent 11½; wing 4; tail 4; tarsus 1.03; above slate colored; scapulars, rump and upper tail-coverts lighter; below white; pale grayish on sides; some specimens have lower parts partly waved with dusky lines, but others, especially full plumaged adults lack these lines; feathers about nostrils, lores, broad streak back of eye, and below the eye also, bill and legs (old birds) black; wings and tail black; tips of secondaries and basal half of primaries white; and tail feathers are marked with white as in *borealis*. The young and immature birds differ considerably from the adult as above described, but they have a sufficient resemblance to be identified by comparison with plate and description.

Habitat.—More southern portions of eastern United States; north regularly to southern Illinois, central Ohio, northwestern Pennsylvania, etc. In eastern and central Pennsylvania this species and also *excubitorides* is seldom met with.

The Loggerhead Shrike is a common summer resident from late in April until about the middle of September, in Erie and Crawford counties. It is said to breed, sometimes, in Lawrence and Mercer counties; but in other sections of the state this bird, and also the White-rumped Shrike, has been observed, so far as I can learn, only as an irregular visitor during migrations, especially in the fall. The following remarks, with relation to this Butcher-bird, as it is called in the Erie region, are taken from my note book: "Erie city, May 20, 1889. To-day Mr. Geo. B. Sennett and I drove out about three miles east of the city; on the road shot three adult shrikes (two males and female), and secured their nests and young. Both nests were built in thorn trees; one nest in a field near the edge of a woods, contained four young, two or three days old, and two eggs. This nest was placed eight feet from the ground, and constructed of small twigs, dried grasses, and plant fibers with an abundance of feathers and cotton. The other nest was situated about four and a half feet from the ground, directly over a cow-path in a meadow; it had evidently been disturbed as it was insecurely placed, being partly turned over. This nest, containing two half fledged males, was composed almost entirely of plant-fiber and chicken feathers; a few small twigs only being on the outside; measures inside of cavity four and one-half inches wide and two and one-half inches in depth."

"Erie, May 21, 1889. To-day Mr. Sennett and I found three nests of shrikes east of the city, all were built in thorn or wild crab apple trees

along the roadside, and were from ten to twelve feet above the ground. One nest contained five fresh eggs; parent bird setting on nest. When I was securing this nest and eggs the old birds flew near me uttering sharp, rasping cries. The notes of the young shrikes are not unlike the squeak of a mouse. Indeed, my friend Mr. Sennett, yesterday when I was killing the young we had captured, stepped on a strap, and hearing the squeaky voices of the birds in my hand, thought at first that he had trod on a mouse. When taking the nests of shrikes which contained young, the old birds were quite bold, and when the squeaky cries of the young were heard, they flew directly at my head, but after finding it impossible to drive me away by these attacks they alighted close by, and remained silent witnesses to the despoliation of their treasures, which were soon secured by me, and then both the old birds were shot. When feeding these birds repair to fence-rows, bushes in fields and along the margins of woods or thickets; they also frequent grass fields and meadows and perch on fences or tall weeds, and they likewise visit plowed grounds in quest of food. They sometimes hover over their prey in a manner very similar to the Sparrow Hawk (*Falco sparverius*). The race known as the White-rumped Shrike (*Lanius ludovicianus excubitorides*, Swains.), is very similar to the Loggerhead, from which it differs chiefly in being paler above, more like *borealis*, and with whitish rump and upper tail-coverts; and it is stated that the wings, tail and tarsus average a little longer, and the bill a trifle smaller than in the Loggerhead.

Family **VIREONIDÆ**. Vireos.

THE VIREOS OR GREENLETS.

These birds frequent chiefly woods and thickets, yet some, particularly the Red-eyed and Warbling, are common during migrations about yards and gardens in towns. Both of these species also often breed in the trees of parks and gardens. The Vireos are rather plainly attired, and were it not for their delightful and musical notes, they would much oftener escape our notice than they do; few of our woods' birds are equal to them as songsters. They live almost constantly in the leafy retreats of trees and shrubbery, rarely, if ever, do they rest on the ground. They subsist almost exclusively on insects, chief among which may be mentioned flies, spiders, beetles and various larvæ; in the late summer and autumn some species feed to a small extent on a few kinds of berries. We have in Pennsylvania six species, viz: the Red-eyed, Warbling, Blue-headed, Yellow-throated, White-eyed and Philadelphia Vireos, and all, with the exception of the Philadelphia Vireo, are common as summer residents or spring and fall migrants. Their beautiful cup-shaped, or basket-like and pendulous nests, are composed of pieces of bark, lichens, rootlets, fine grass stems, bits of paper, etc., and suspended from forked twigs. Vireos nest in trees and bushes, usually in groves or forests; some build close to the ground; others erect their pensile homes on the highest twigs of tall forest trees. Their elongate-ovate eggs, commonly five, are white, thinly speckled or dotted, usually about the larger end with black or brown. They measure generally a little more than three-fourths of an inch long by half an inch wide. The Red and White-eyed Vireos breed abundantly with us, and in a large proportion of their nests, especially in nests of the Red-eyed species, you will find Cowbirds' eggs or young.

Wild Goose.

Male.

The Red-eyed, Philadelphia and Warbling Vireos (subgenus *Vireosylva* Bonap.) have *no* wing bands, but the White-eyed, Yellow-throated and Blue-headed species (subgenus *Lanivireo* Bd.) have *two* distinct wing bands formed by white tips of middle and greater coverts. The feathers of upper parts are greenish-olive of different shades; the top of head in some is similar to the back, but in others the top of head is more or less plumbeous. The lower parts are whitish or yellowish or both; eyes brown, except in the Red and White-eyed species, and even the young of these have brownish irides. The legs and feet are generally dark lead color, and the bills are similar but paler below. The sexes are alike, and the young are not very materially different; size small, the white-eyed (smallest) is about 4½ inches long and the Red-eyed (largest) is about 6½ inches in length. The short, straight, stout and compressed bill has a slightly curved culmen, and it is notched and rather abruptly hooked at tip. Wings pointed or rounded (very slightly) and equal to or longer than the even tail. Primaries 10; the first much the smallest; third or fourth quills longest. Four toes, three in front and one behind; claws much curved and sharp; short basal joint of middle toe wholly adherent to both outer and inner toes; tarsus rather slender and longer than middle toe with claw. "Next after the Warblers, the Greenlets are the most delightful of our forest birds, though their charms address the ear and not the eye. Clad in simple tints that harmonize with the verdure, these gentle songsters warble their lays unseen, while the foliage itself seems stirred to music. In the quaint and curious ditty of the White-eye—in the earnest, voluble strains of the Red-eye—in the tender secret that the Warbling Vireo confides in whispers to the passing breeze—he is insensible who does not hear the echo of thoughts he never clothes in words."—*Coues.*

Genus **VIREO** Vieillot.

Vireo olivaceus (Linn.).

Red-eyed Vireo.

Description (*Plate 40*).

Largest of the genus. Length about 6¼; extent about 10½ inches; bill blackish above, below bluish-white; feet and legs lead color; iris red; back, rump, upper parts of wing and tail feathers olive-green; sides of head and neck paler; crown dark-ash, edged with a blackish line; a well-defined whitish line from nostril over the eye and back of it; a dusky stripe through the eye; under parts white, shaded on the sides and tail-coverts with greenish-yellow, brightest on the under wing-coverts and crissum. Tail and wing feathers blackish, edged on the outside with greenish-yellow, with whitish on inside.

Young.—Irides plain brown or reddish-brown; ash of crown less distinct; grayish-yellow rather than greenish above, but the sides, under wing and tail-coverts are quite brightly colored.

Habitat.—Eastern North America, to the Rocky mountains, north to the Arctic regions.

The Red-eyed Vireo is a common summer resident from late in April to the last of September. In this state it is much more abundant than any other of the Vireos. In summer the voice of this agile, fluent and tireless songster is heard on almost every hand in forests and groves. This bird is a most devoted foster-parent, feeding and guarding the clamorous young Cow-bird with the same care and solicitude that it bestows upon its own offspring. Indeed, sometimes it seems that they are even more attentive to the noisy, red-mouthed Cow-birds than they are to their own young. The Red-eyed Vireo, like others of the family,

subsists chiefly on insects, which he captures on the wing, or secures while gleaning among the branches and leaves. In the late summer and autumn months he feeds, more or less, on raspberries, mulberries, pokeberries and wild grapes. His white shirt-front is often soiled with the bright juices of the fruits on which he feeds.

Vireo philadelphicus (Cass.).

Philadelphia Vireo.

DESCRIPTION.

Length about 4.90; extent $8\frac{1}{4}$; tail $2\frac{1}{4}$; wing $2\frac{5}{8}$; tarsus about .64; bill, along culmen, .40. Very similar to *gilvus*, but bill is smaller and not nearly so stout as in latter bird; *no* spurious primary as in *gilvus*; chin and belly white, rest of lower parts pale sulphur-yellow, brighest on throat and breast; above dull olive-green, grayish-blue on crown with faint greenish tint; rump brighter than back; white line from base of maxilla over eye; indistinct whitish spot below eye; blackish spot in front of eye.

Habitat.—Eastern North America, breeding chiefly north of United States north to Hudson's Bay; south, in winter, to Costa Rica.

The Philadelphia Vireo is a regular but rather rare spring and fall migrant, arriving here late in April or early in May, and after the 20th of May it is seldom seen in Pennsylvania until it migrates southward in September. Prof. August Kock, of Williamsport, informs me that he is under the impression that this bird breeds occasionally in the mountainous regions of Lycoming county; and Mr. T. L. Neff gives it in his list as a probable breeder in Cumberland county. This bird is found generally in woods about the borders of streams. The Philadelphia Vireo, although similar to the Warbling, can be recognized from the latter by its usually brighter under parts, and although it has a resemblance to the White-eyed species, it has not, like the last named, whitish wing bars. Its song is very much the same as that of *olivaceus*.

Vireo gilvus (Vieill.).

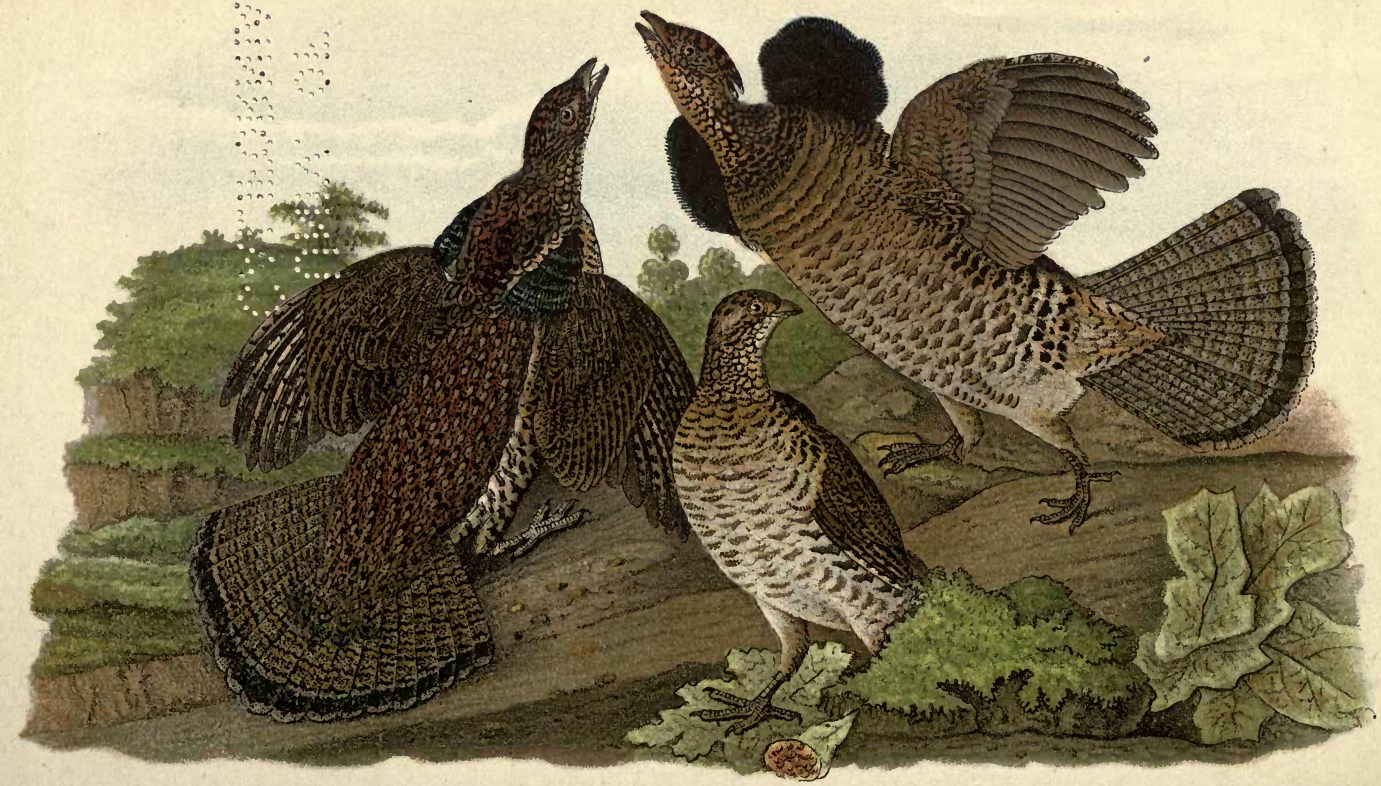
Warbling Vireo.

DESCRIPTION.

Length about $5\frac{1}{2}$; extent about 9; wing $2\frac{3}{4}$; tail 2.20; tarsus .69; bill stout, very much like a Red-eyed Vireo, and from back part of nostril to end along culmen about .50; similar in color to *philadelphicus*, but upper parts are more grayish and paler; general color of lower parts white; sides, flanks and under tail-coverts, and part of breast tinged with pale-yellow; the spurious first quill measures about five-eighths of an inch in length.

Habitat.—North America in general, from the Fur countries to Mexico.

The Warbling Vireo is found in Pennsylvania as a common summer resident from the last week in April until late in September; in the southern part of the state I have taken specimens as late as October 10. This delightful songster is rarely seen or heard in the depths of the



Ruffed Grouse.

forest, but in groves, along the borders of streams, in orchards, parks and gardens he is common. Its nest is usually built at a considerable height in trees.

Vireo flavifrons VIEILL.

Yellow-throated Vireo.

DESCRIPTION (*Plate 19*).

Length about 5½; extent about 9¾; wing 3; tail 2¼; bill about .50 long and rather stout. Dusky spot in front of eye, a yellowish loral streak; ring around eye, chin, throat and breast bright yellow; top of head, back and sides of neck, and upper part of back decided olive-green; tertials edged with white; lower parts of back, rump, tail-coverts (above) and lesser wing-coverts ashy; belly to end of lower tail-coverts pure white; sides a little grayish; no spurious quill; first and fourth quills equal in length.

Habitat.—Eastern United States, south in winter to Costa Rica.

This species is most common as a spring and fall migrant, arriving here late in April and departing in September. It breeds sparingly or irregularly in nearly all sections of the state, but is, apparently, much more frequently met with in the mountainous and elevated woodland regions, particularly in the northern counties, than elsewhere as a summer resident. During migrations I have observed these bright yellow-throated songsters, which, although smaller, resemble somewhat the noisy Chat, in orchards, in trees along sidewalks and in lawns. Usually, however, this vireo is to be found high in trees of forests in the vicinity of streams. In the Eastern states this species is said to build in orchards, about buildings, as well as in woodland. In Pennsylvania the Yellow-throated Vireo always, I have found, breeds in woods, and commonly builds its lichen-covered abode twenty-five, thirty or forty feet above the ground. In the late summer, fall and winter months this bird feeds frequently on small berries.

Vireo solitarius (WILS.).

Blue-headed Vireo.

DESCRIPTION.

Length about 5½ inches; extent 9; wing 2.90; tail 2¼. Top of head, portion of neck behind, and sides of head leaden-gray; rest of upper parts, including rump and tail-coverts, olive-green; edges of some wing feathers and lateral tail feathers edged with greenish-white and whitish; below white; sides, flanks and crissum greenish-yellow and yellow, the latter paler on axillars and about crissum; spurious quill well developed, being about one-third as long as second; white ring around eye, white loral line, and a dusky spot below the latter.

Habitat.—Eastern United States to the plains. In winter south to Mexico and Guatemala.

The Blue-headed Vireo, like the species last described, is an inhabitant of woodland. It arrives here usually a few days before the Yellow-

throated, and in the fall is seen some seasons as late as the middle of October. I have usually found this vireo in the lower branches of trees or in high bushes. Sometimes this bird is shy, but usually it can be approached without any trouble. I have seen these birds several times in the summer months in the mountains of Blair, Centre and Elk counties, but never found nests. My friend, Prof. A. Kock, to whom I am indebted for much valuable information concerning our feathered fauna, says it is a common breeder in Lycoming county. Mr. T. L. Neff, Cumberland county, Prof. H. J. Roddy, Perry county, have found it breeding, and in the mountainous regions of Lackawanna county Mr. H. W. Williams has observed it as a regular summer resident. The beautiful cup-shaped nest of this bird is suspended from a forked twig "in undergrowth or lower branches of small trees in woods."

Food consists chiefly of insects, but in late summer, fall and winter small berries are also fed upon.

Vireo noveboracensis (Gmel.)

White-eyed Vireo.

DESCRIPTION.

Length 5 or a little less; extent about 8; wings 2½ or a little less; tail about 2. Spurious quill well developed, about half as long as the second, and similar to it also in shape; wings rather rounded; a yellow stripe from base of maxilla joins *yellow ring* around eye, in front of which is a dusky spot; above bright olive-green; the hind neck (posterior half of head also in some specimens) ashy; throat, upper part of breast white (grayish-white in some specimens), belly white and under tail-coverts white with yellow tint; sides and axillars bright yellow; eyes white, in young brownish.

Habitat.—Eastern United States, west to the Rocky mountains, south in winter to Guatemala. Resident in the Bermudas.

The White-eyed Vireo is a common summer resident, very generally distributed, in suitable localities, throughout the state, from late in April until sometimes the last week in October. The other species of this family inhabit chiefly woodland areas, but this curious white-eyed, inquisitive, scolding, unsuspicious, shrill-voiced, and vehement songster, resides in thickets and tangled undergrowth, along the edges of woods, etc., usually in the vicinity of water. In different sections of Pennsylvania where green briers and blackberry bushes abound, there you will generally find the White-eye. This, like the two species last mentioned, is a familiar winter resident in Florida, where I have observed them feeding on palmetto berries, mulberries and different kinds of insects. When in Pennsylvania the White-eye subsists mainly on an insect diet, like that of his near relatives, and in the summer he feeds to some extent on blackberries, raspberries, etc., the juices of which often stain the feathers around the bill. The swaying nest, quite large for the size of its irritable owner, is hung from a forked twig in a bush or tree, and is mostly about four, six or eight feet from the ground.

FAMILY MNIOTILTIDÆ. WOOD-WARBLERS.

THE WOOD-WARBLERS.

Nearly forty species and subspecies of this family have been observed during recent years in Pennsylvania, either as spring and fall migrants, summer residents or straggling and accidental visitors. Sometimes, though not often, during mild winters—generally in November or December—solitary Myrtle, Yellow Palm and Pine Warblers, particularly the Myrtle, are found in sheltered localities (to the southward) mostly in company with some of the sparrow tribe. I have, on two occasions, seen Yellow-rumps with Chickadees, and once, late in November, I shot a Pine Warbler in a cedar tree where a small flock of Waxwings and two or three Robins were feeding. The birds of this group, with a few exceptions, are small—averaging about 5 inches in length and 8 inches in extent—neat and trim in build, active, energetic in movement, and entertaining in song. They have brown eyes, and their slender, naked tarsi, in species, not otherwise particularized in the descriptions, are brownish. The usually blackish, and in most species slender, tapering, and awl-like bill will greatly aid in recognizing a warbler from members of the following families: *Fringillidæ* (bill conical, commissure more or less angulated); *Vireonidæ* (bill distinctly notched and hooked); *Tanagridæ* (bill stout, much like a sparrow's, with lobe and tooth near middle of commissure); *Hirundinidæ* (bill short, broad, flat and gape reaching to eyes). The Redstart (*S. ruticilla*), Hooded (*S. mitrata*), Canadian (*S. canadensis*), and Wilson's (*S. pusilla*) flycatching warblers, have long stiff rictal bristles and wide (at base) bills, slightly notched and somewhat hooked like the *Tyrannidæ*. This flycatcher-like bill is most perfect in the Redstart; but the similarity of bills in these birds need give the beginner no concern as the showy dress of these warblers is greatly different from that of the *Tyrannidæ*. Less than a dozen species of this family are generally dispersed throughout the state during the summer season, but in some localities, particularly in the timbered and higher mountain ranges, other species reside and rear their young, often in such secluded places, that our most enthusiastic, tireless and successful field-naturalists have, in many instances, failed to discover the nests. From repeated visits which I have made in June, July and the early part of August, to the pine, hemlock and hard wooded forests, or in extensive laurel thickets, and about the numerous ravines and bushy, swampy places, along the sinuous, placid or turbulent streams in our mountainous regions, I am quite confident that several species which are commonly recorded as breeding considerably north of the Keystone commonwealth, breed regularly, though sparingly, within our limits.

The following list on the next four pages gives names of species which are positively known to nest in Pennsylvania, and others that are believed, from evidence which is deemed sufficient, to breed occasionally, at least, within our borders.

One* indicates species whose nests, eggs or young (not fully grown) have been taken by the author.

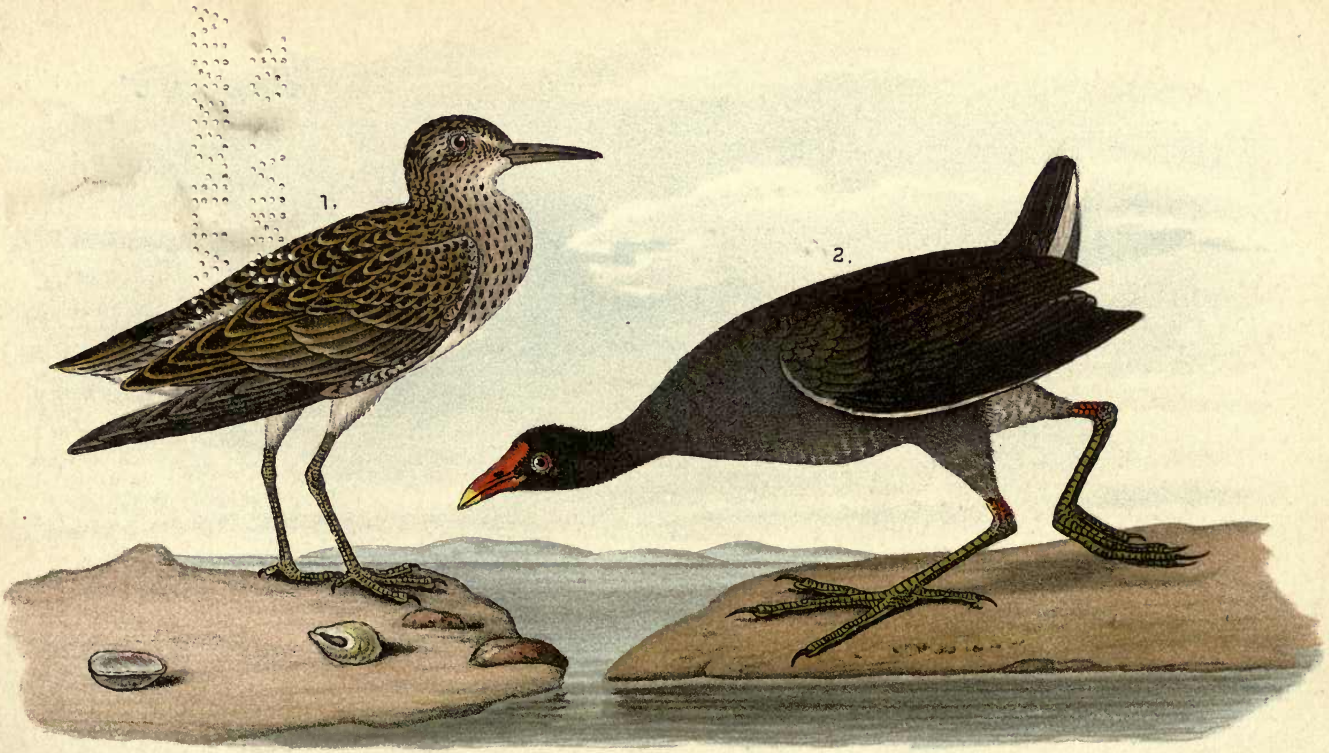
Two** indicate species which have been seen during the breeding season by the author, but the nests, eggs or young have not been taken by him. The other species included in the list are mentioned on the authority of different observers, to whom credit is given in the column headed "Remarks."

A indicates column to which the bird belongs.

The fifth column contains a condensed description of nesting materials, which are generally used, the sites chosen, etc.

Descriptions of eggs of all species, and nesting materials and breeding sites of those marked (R) have been compiled from Ridgway's Manual of N. A. Birds.

	Regular breeders and most of them generally distributed.	Breed chiefly in mountainous districts.	Probable breeders; locally distributed in mountainous or other regions.	NESTS, EGGS, ETC.	REMARKS.
**M. varia.* Bk. & White W.	A	....	....	Nest on ground, in woods; strips of bark, leaves, hair, mosses or fine roots; eggs, five, .67 by .57, creamy-white, speckled chiefly on larger end with reddish-brown.	Rather common.
***P. citrea.* Prot. W.	....	....	A	"Nest of mosses, built in deserted woodpeckers' holes, or other cavities in trees or stumps standing in or near water. Eggs, three to seven, .68 by .55, glossy-white, creamy-white, or creamy-buff, thickly spotted with rich madder-brown and purplish-gray."—(R.)	Very rare; specimens have been taken in summer in Chester county (*Warren*), and also in Lancaster county (*J. J. Labhart*).
**H. vermivorus.* Worm-eating W.	A	....	....	The nest of leaves, hair-moss or fine grass; is usually embedded in the ground, sometimes on level ground, in thickets or woods. Eggs, four to six, mostly five, ".68 by .52, creamy-white or pinkish-white, finely speckled, on or round larger end, with reddish-brown."	Abundant in some localities, rather rare in others, more numerous apparently in southeastern Pennsylvania than elsewhere, but quite plentiful in parts of Clarion and Venango counties; rather rare in northern tier of counties.
**H. pinus.* Blue-winged W.	A	....	....	Nest on ground; cup-like in shape, and composed of leaves, fine bark-strips, or rootlets; generally in open woods or thickets. Eggs, four to five, ".60 by .48, white, finely—usually minutely and rather sparsely—speckled with brown and black, chiefly on or round larger end."	Common in some sections, especially in southeastern Pennsylvania. Rather rare in many other parts of the state.
***H. chrysoptera.* Golden-winged W.	....	....	A	The nest is placed, it is stated, usually in swampy thickets, on or near the ground; similar to that of *H. pinus*. "Eggs, three to five, white, finely—usually sparsely and rather minutely—speckled with brown, chiefly on or round larger end."	Have seen, on two occasions, adults in July.
***H. ruficapilla.* Nashville W.	....	....	A	The nest as described by different writers is similar to that of *H. pinus*. Eggs, four to five, ".61 by .47, white or creamy-white, finely speckled, chiefly on larger end, with reddish-brown."	Regular spring and fall migrant; but have seen several individuals in midsummer in mountains of Cameron, Elk, Cambria and Blair counties.



1. Pectoral Sandpiper. *2. Florida Gallinule.*

C. americana, Parula W.	A	. . . .	. . . .	The nest is usually, in this region, in hanging bunches of lichens of the genus *Usnea*; generally low down in trees in woods. Eggs, four or five, .64 by .46, similar in color to those of *ruficapilla*, but more thickly speckled with reddish-brown.	Breeds more or less regularly in nearly every locality where the pendant tufts of *Usnea* are found; but doubtless more common as a breeder in upper half of the state, throughout its extent.
D. æstiva, Yellow W.	A	. . . .	. . . .	Small, compact, cup-shaped nest, of plant fibers, spiders' webs, woolly plant substances, feathers, etc., in upright twigs of trees or bushes. Eggs, four or five, pale greenish or grayish-white, spotted and blotched with brown, blackish and lilac-gray. .66 by 48.	Common.
**D. cærulescens*, Bk. Thr'd Blue W.	. . . .	A	. . . .	"Nests on trees in high woods, twenty to fifty feet or more from ground, compact, composed of fine, dry grasses, spiders' webs, lichens, strips of fine bark, etc., cavity 1.40 deep by 2.00 across. Eggs, usually four, .68 by .49, buffy-whitish or greenish-white, more or less heavily spotted or blotched with reddish-brown."—(R.)	Dr. Coues (Key) says it "nests in bushes, close to the ground." I have several times seen these warblers in mountain forests and thickets in summer, and Messrs. A. Kock, Lycoming co., Otto Behr, Sullivan co., Dr. Van Fleet, Clinton co., H. J. Roddy, Perry co., H. C. Kirkpatrick, Crawford co., H. L. Greenlund, Warren co., G. C. Perry, Susq. co., report it as a regular breeder.
**D. coronata*, Myrtle W.	. . . .	. . . .	A	"Nest usually low down, in coniferous trees. Eggs, .70 by .53, creamy-white, pale, creamy-buff or dull white, spotted or blotched, chiefly on or round larger end, with brown and lilac-gray, sometimes mixed with smaller markings of blackish."—(R.) The nest is said to be composed of soft plant fibers, fine grasses and feathers—(*Davie*).	By referring to my note books, I find that I have seen three of these warblers, in pine and hemlock trees, in mountains: One, June 25, 1888, Cameron county; one, July 14, 1889, McKean county, and the last, August 10, 1889, in Clinton county.
**D. maculosa*, Magnolia W.	. . . .	A	. . . .	"Nest of fine twigs, grass and weed stalks, etc., lined with fine black rootlets, in small spruces or hemlocks, three to thirty-five feet from ground. Eggs (four mostly) .63 by .48, creamy-white, blotched with rich brown, paler brown, and lilac (sometimes more finely spotted)."—(R.)	Breeds in Crawford county, in hemlock trees; nest set flat and shallow; composed of small dried twigs of the hemlock, glued with saliva to the outer portions of the living branches. No lining in nest (*G. B. Sennett*). Breeds regularly also in Lycoming county (*Kock*); Sullivan county (*Behr*); Somerset county (*Moore*).
**D. cærulea*, Cerulean W.	. . . .	. . . .	A	"Nest in trees in high deciduous woods, twenty to fifty feet or more from ground, compact, cup-shaped, composed of plant fibers, strips of fine bark, spiders' webs, etc. Eggs, about .69 by .53, white, or dull greenish-white speckled with brown, chiefly round larger end."—(R.)	Rare summer visitor in Somerset county (*Dr. Moore*). Breeds in Clinton county (*Dr. W. Van Fleet*). Probably breeds in Perry county (*H. J. Roddy*).
**D. pensylvanica*, Chestnut-sided W.	A	. . . .	. . . .	The nest, of bark-strips, stems of fine grasses, lined with woolly plant substances, hair, etc., is built in small trees or bushes in tangled undergrowth, generally near streams. Eggs, usually four, are about same in color as those of *coronata*.	Most plentiful during the summer time in mountainous districts.
**D. blackburniæ*, Blackburnian W.	. . . .	A	. . . .	"Nest, in evergreen trees, rather bulky, composed of downy materials, especially down of the cat-tail (*Typha latifolia*), lined with fine lichens, horse hairs, etc. * * Eggs, .68 by .50, greenish-white or very pale bluish-green, speckled or spotted, chiefly on or round larger end, with brown or reddish-brown and lilac-gray."—(R.)	Tolerably common in some mountainous regions; but rather rare or only occasionally observed, except during migration in other sections of Pennsylvania.

	Regular breeders and most of them generally distributed.	Breed chiefly in mountainous districts.	Probable breeders: locally distributed in mountainous or other regions.	NESTS, EGGS, ETC.	REMARKS.
****D. dominica,** Yellow-throated W.	....	....	A	In southern states the nest is said to be placed upon branches of pine trees; it is constructed of strips of bark, small twigs, plant down, feathers, etc., and often hidden in the pendulous tufts of "Spanish" moss. Eggs, .69 by .52, dull greenish-white or grayish-white, spotted with different shades of umber-brown and lilac-gray.	The late C. D. Wood, of Philadelphia, took two in midsummer, in Delaware county, about four years ago. I have two specimens taken in summer in Chester county.
***D. virens,** Black-thr'd Green W.	....	A	....	Builds a compact nest of fine bark-strips, grasses, feathers, downy vegetable substances, etc., "in trees usually at a considerable height. Eggs, .67 by .49, white or creamy-white, spotted with reddish brown and lilac-gray, mixed with a few darker specks."—(R.)	Oftener seen in the forests in mountains than elsewhere; and more plentiful in northern Pennsylvania in summer. G. B. Sennett and H. C. Kirkpatrick, both report *virens* as breeding in Crawford county. Dr. Triechler says it breeds occasionally in Lancaster county. I have seen adults late in June and in July in Chester and Delaware counties.
D. kirtlandi, Kirtland's W.	....	....	A	The nest and eggs of this warbler remain to be discovered.	Saw one and its family; shot one June 25, 1885, near Dublin Gap Springs (*H. J. Roddy*).
****D. vigorsii,** Pine W.	....	A	....	The nest, composed of strips of bark, a few leaves, fine grasses, feathers, etc., is said to be built usually at considerable elevation in pine trees in woods. "Eggs, .69 by .53, dull white, grayish-white or dull purplish-white, speckled or spotted with madder-brown and lilac-gray, usually most heavily round larger end."	Have taken three in midsummer in pine and hemlock woods in mountains.
****D. discolor,** Prairie W.	....	A	....	Nest a small, compact, cup-shaped structure of vegetable fibers, etc., on bushes or small trees, generally close to the ground. "Eggs, .63 by .47, white or buffy-white, speckled chiefly on or round larger end (often wreathed) with burnt umber or vandyke-brown and lilac-gray."	Rare breeder in Perry county (*H. J. Roddy*). Have seen birds of this species during summer months in high grasses, weeds, cedar thickets and other bushy places in old fields on the Barren ridge in southeastern Pennsylvania.

**S. aurocapillus.* Oven-bird.	A	. . . .	. . . .	Bulky nest (top usually covered over or roofed); dead leaves, rootlets, dried grasses, etc., embedded in ground on hillside or other dry places in woods. Eggs, four to six, .80 by .61, creamy-white, spotted with reddish-brown.	Common.
***S. noveboracensis.* Water Thrush.	. . . .	A	. . .	The nest, quite similar in materials used, is placed "on or near ground in wet woods or on border of swamps; open above. Eggs about the same as those of Oven-bird."	Breeds in Clinton and Clearfield counties (*Dr. Van Fleet*). Breeds in Crawford county (*G. B. Sennett*).
***S. motacilla.* La. Water Thrush.	. . . .	A	. . . .	Nest a bulky structure of dried leaves, fine rootlets, grasses, etc., carefully hidden in crevices among roots of upturned trees, old logs, stumps or mossy banks—always in moist or swampy woods. Eggs, .73 by .59." (Like last in markings and color.)—(R.)	Breeds in Crawford county (*G. B. Sennett*). Breeds in York county (*Messrs. Geo. Miller and Casper Loucks*). I have seen the species in summer in Chester and other counties.
**G. formosa.* Kentucky W.	A	. . . .	. . . .	The bulky nest of dried leaves, fine roots, etc., is built on ground in woods. Eggs, four to five, "..72 by .56, white or creamy-white, speckled or spotted with brown, reddish-brown, and lilac-gray."	Common in many localities in eastern Pennsylvania.
G. philadelphia. Mourning W.	. . . .	A	. . . .	Breeds in woods in mountains. The nest, which is said to be very much like that of a Maryland Yellow-throat, is built "on or near the ground. Eggs, .71 by .53, colored like those of *G. formosa.*"	Breeds in Sullivan county (*Otto Behr*). Breeds in Clinton county (*Dr. W. Van Fleet*).
**G. trichas.* Md. Yellow-throat.	A	. . . .	. . . .	Nest rather large, of dead leaves, grasses, etc., on or near ground (usually in low, damp places), in tufts of grass, among weeds, or hidden by low bushes, in which, or at the base of the latter, it is often placed. Eggs, usually five, .70 by .52, white, finely speckled, generally about larger end, with black and brown.	Common.
**I. virens.* Chat.	A	. . . .	. . . .	Nest of leaves, grape-vine bark, grasses, etc., in briery thickets. Eggs, four to five, .89 by .67, white spotted with reddish-brown.	Common.
***S. mitrata.* Hooded W.	A	. . . .	. . . .	"Nest in low bushes in undergrowth of high, damp woods. Eggs, three to four .70 by .53, white or buffy-white, speckled or spotted round larger end with reddish-brown and lilac-gray, usually mixed with a few black specks or pen-lines."—(R.) Nesting materials, leaves, shreds of bark and scales of beech buds woven compactly together with spiders' webs; lined sometimes with hair and grape vine bark fibers—(*Davie*).	I have found this warbler to be more numerous in mountainous regions than elsewhere.
***S. canadensis.* Canadian W.	. . . .	A	. . . .	"Nest in clumps of weeds or tussocks of grass in swampy woods. Eggs, three to five, .68 by .51, colored like those of *S. mitrata.*"—(R.) Mr. O. Davie says the nest is composed of "dry weeds, fine roots, with a lining of hair."	Breeds sparingly in Lycoming county (*A. Kock*). Regular breeder in Jack's Narrows and on Jack's mountains (*H. J. Roddy*). Breeds occasionally in Lancaster county (*Dr. Triechler*).
**S ruticilla.* Am. Redstart.	A	. . . .	. . . .	Cup-shaped, compact nest of different vegetable fibres, spiders' webs and horse-hair in a fork or on limb of small tree, usually eight to ten feet from ground Eggs, four or five, "..63 by .48, white, greenish, or grayish-white, speckled or spotted, chiefly around larger end, with brown and lilac."	Very common summer resident in some of the mountainous districts.

When migrating the males come, particularly in spring, in advance of the females; the majority migrate at night, flying usually at a considerable elevation. Certain members of this family are remarkable for the melody of their song, many species which migrate north, penetrating, as some do, even the Arctic solitudes to rear their young, are said to possess most exquisite vocal powers.

Although several species are ground nesters, and live chiefly on the ground, and some others construct their abodes near mother earth, on which they often are seen, the majority of this family inhabit trees, bushes and shrubbery. Some, especially most species of *Dendroica*, are found usually in trees or bushes, and seldom do they visit terra firma; and certain warblers inhabit almost continually the leafy branches of high forest trees, where they actively engage in the pursuit of divers forms of insect life.

During migrations many of these birds are common visitors to the orchards and shade trees about the habitations of man. The Oven-bird, one of our most common summer birds. in hilly and dry places in the dusky recesses of woods, spends most of his time on the ground, but frequently, when disturbed, and often when singing, he perches on the low limbs of trees and bushes. The Water and Louisiana Thrushes, often perch on low limbs and twigs, on logs, etc., but they are mainly terrestrial, and may be looked for about swamps, pools and streams in dark woods and thickets. The Parula Warbler is generally seen in the tops of high forest trees during migrations; and the Maryland Yellow-throat, a common frequenter of shrubbery and underbrush, frequently is found in company with other warblers in orchards, where all render efficient service. The Kentucky Warbler, which could readily be mistaken for the Maryland Yellow-throat, by a careless observer, I have never seen in orchards, and rarely, if ever, is it observed high in trees, although it often alights in low bushes. The favorite abiding place of the Kentucky is in swampy thickets, or low moist situations in woods. He especially delights to hide among the leaves of the Skunk-cabbage (*Symplocarpus fœditus*). The loquacious but active Yellow-breasted Chat, an inhabitant of briery thickets and tangled undergrowth, often repairs to high branches of trees to sing his loud and varied song. The insect-like song of the Blue-winged Warbler, very similar to the notes of the Grasshopper Sparrow, will frequently enable you to detect its source in the top of a sapling or high bush, of a thicket or in a tree along the edge of a forest or in open woods. The Black and White Warbler, like a Nuthatch or Brown Creeper, may generally be seen circling round the trunks and limbs of trees, in woods and swamps, and when migrating this little warbler not unfrequently visits orchards, trees in lawns, gardens and parks. Water Thrushes, the Palm, Yellow Palm Warblers and Oven-bird, by their peculiar jerking motions, often remind one of some of the sandpipers or the American Pipit. As you catch a glimpse of the Maryland Yellow-throat, and hear his sharp note, as he vanishes in the thick undergrowth, you are reminded of certain peculiarities so characteristic of wrens. The Parula and Pine Warblers, are often seen to hang downward, like the titmice when feeding, and the ever active Redstart in some ways is not unlike the Tyrant Flycatchers.

While it is true that a large number of the warblers included in our *fauna* breed regularly, in suitable localities, in some portion or other of the state, the members of this family are far more numerous during migrations (usually in May and September) than at any other time; and some seasons different species will often be noticed to be much more plentiful than in corresponding seasons in other years. Primaries nine; wings long and pointed, and longer than the almost even tail, except in the genera *Geothlypsis* and *Icteria*. The Maryland Yellow-throat, Chat and Mourning Warbler have shortish and rounded wings. The bill is, usually, quite straight and acute, and shorter than the head; in many of these birds the bill is slightly notched toward the tip but *not* hooked. Some have prominent rictal bristles, others have none. In the genus *Dendroica* the conical attenuated bill, compressed in the middle and distinctly notched near the end is furnished with short, but generally distinct, bristles at base. All this family have four toes, three in front, one behind; claws small, sharp and curved. Referring to these birds Dr. Coues says: "With

tireless industry do the warblers befriend the human race; their unconscious zeal plays due part in the nice adjustment of nature's forces, helping to bring about that balance of vegetable and insect life without which agriculture would be in vain. They visit the orchard when the apple and pear, the plum, peach and cherry are in blossom, seeming to revel carelessly amid the sweet-scented and delicately tinted blossoms, but never faltering in their good work. They peer into the crevices of the bark, scrutinize each leaf, and explore the very heart of the buds, to detect, drag forth, and destroy those tiny creatures, singly insignificant, collectively a scourge, which prey upon the hopes of the fruit-grower, and which, if undisturbed, would bring his care to nought." Warblers subsist almost exclusively on insects, such as flies, beetles, spiders, grasshoppers, plant-lice, and various kinds of larvæ.

The Myrtle, Audubon's, Tennessee, Yellow Palm and Pine Warblers, sometimes, though rarely in this region, feed on small fruits, at least it is supposed they do, from the fact that I have found in the stomachs of each of these species, which were shot in the fall or winter months, small seeds of fruits.

GENUS **MNIOTILTA** VIEILLOT.

Mniotilta varia (LINN.).

Black and White Warbler; Black and White Creeper.

DESCRIPTION (*Plate 92*).

Bill rather long; maxilla very slightly curved; very short rictal bristles. Black above streaked with white; below whitish streaked with black or dusky; two white wing bars; two pairs outer tail feathers with white spots on inner webs near end. Length about 5½; extent about 8½ inches.

Habitat.—Eastern United States to the plains, north to Fort Simpson, south in winter, to Central America and the West Indies.

The Black and White Warbler arrives in Pennsylvania about the last week in April and remains sometimes as late as October 20. Tolerably common and generally distributed throughout the state during migrations. Breeds quite generally throughout the commonwealth, but in summer is seldom seen anywhere except in the woodland where it rears its young. The nest, usually more or less embedded in the ground, is mostly so carefully hidden by dead leaves that its discovery is frequently only made accidentally. Three nests which I have found have all been placed on hillsides in open woods near water. Two of these nests had been visited by Cow-birds, as one contained two foreign eggs, and the other had a young Cow-bird with the young of the warblers. The food of this species consists chiefly of small beetles, spiders, flies, larvæ, and Mr. Gentry says, earthworms also constitute a share of its diet.

GENUS **PROTONOTARIA** BAIRD.

Protonotaria citrea (BODD.).

Prothonotary Warbler.

DESCRIPTION.

The black bill is long (a little shorter than head), sharp and distinctly notched, and without bristles; wings long and pointed; tail nearly even. Head and under parts

yellow; lower tail-coverts, lining of wings, some feathers about anus and inner webs of most tail feathers white; rest of upper parts generally olive green, wings and tail lead color. Length about 5½; extent about 9½.

Habitat.—Eastern United States, chiefly southward; in winter, Cuba and Central America.

Very rare and irregular visitor. A few specimens, probably about ten, have been captured during the last twenty-five years in the southeastern part of the state. I have taken two specimens, one in midsummer the other in May, in Chester county; a few individuals have been taken at irregular intervals either in spring, summer or fall in Philadelphia and Delaware counties. A male of this species, in the museum at Lancaster city, was taken some years ago in Lancaster county, in the summer.

Genus **HELMITHERUS** Rafinesque.

Helmitherus vermivorus (Gmel.).

Worm-eating Warbler.

Description (*Plate 94*).

The bill nearly as long as head, is quite large, stout and sharp-pointed; maxilla blackish-brown; lower mandible, also legs and feet much lighter in color; the rictal bristles absent; bill unnotched. Plumage of upper parts greenish-olive; head has seven longitudinal stripes, to wit: two black on crown, divided by a brownish-yellow mediam stripe, on either side of these black stripes extending from nostrils back over and beyond are brownish-yellow stripes (one on each side) and back of the eye is a black stripe (each side) alongside of crown; dusky spot in front of eye; upper surface of wings and tail olivaceous; lower surface paler; tail and wings unmarked; lower parts pale brownish-yellow or buffy, palest on chin and middle of belly; sides very similar to back but less greenish. Length (male) about 5½; extent 8¾; wing about 3; tail about 2; bill a little over .60; tarsus .70. The female is usually a trifle smaller.

Habitat.—Eastern United States, north to southern New York and southern New England, south in winter to Cuba and Central America.

The Worm-eating Warbler arrives in Pennsylvania about the first week in May and remains here until September. I once captured a specimen in Dauphin county on the 15th of September, and another in Franklin county on the 20th of September, but usually the bird is seldom seen here after the first of the month named. This warbler is generally found on or near the ground. I have never seen one high in trees, but have often observed them in bushes or on the lower limbs of trees. I believe that two broods are frequently reared in a season in this locality. During its residence with us this interesting and unsuspicious haunter of thickets and woods is very generally dispersed throughout the state, but in no section of the commonwealth does it occur more plentifully than in the southeastern counties, especially in portions of Chester county, where, doubtless, more nests and eggs have been taken by Messrs. Thomas H. Jackson, Josiah Hoopes and Samuel B. Ladd, all of West Chester, Penna., than in any other (perhaps all other parts)

1. Turkey Vulture. 2, 3. Cooper's Hawk.

2. Adult; 3. Young.

part of the country. The first authentic account which we had of the nest and eggs of this species was published* by Mr. Thomas H. Jackson, of West Chester. This account, with a few additional remarks, have been kindly given to me by Mr. Jackson, and are as follows:

"On the 6th of June, 1869, I found a nest of this species containing five eggs. It was placed in a hollow on the ground much like the nest of the Oven-bird (*Seiurus aurocapillus*) and was hidden from sight by the dry leaves that lay thickly around. The nest was composed externally of dead leaves, mostly those of the beech, while the interior was prettily lined with the fine thread-like stalks of the hair-moss (*Polytrichium*). Altogether it was a very neat structure, and looked to me as though the owner was habitually a ground-nester. The eggs most nearly resemble those of the White-bellied Nuthatch (*Sitta carolinensis*) though the markings are fewer and less distinct. So closely did the female set that I captured her without difficulty by placing my hat over the nest. During the twenty years following the finding of this nest I have probably found and examined fifty others, and none of them vary in any important particulars from the original nest. Every one has contained the hair-moss lining, though the eggs, when examined in series, show a wide degree of variation."

The stomach contents of fifteen of these warblers which I have examined consisted chiefly of remains of beetles, spiders and larvæ.

Genus **HELMINTHOPHILA** † Ridgway.

Helminthophila pinus (Linn.).

Blue-winged Warbler; Blue-winged Yellow Warbler.

Description (*Plate 19*).

Bill and legs (dried skins) former blue-black, the latter dark-brownish. Top of head, most of sides of same, chin, neck in front, breast, sides and belly rich yellow; black patch in front of eye and a narrow black streak behind it; under tail-coverts mostly white; wings have two white (or whitish in some specimens) bars. Rest of upper parts olive-green, brightest on rump; the inner webs of three outer tail feathers are more or less extensively marked with white; the general color of upper surface of wings and tail is slate or pale bluish-gray. Female and young very similar but duller.

Length (male) 5; extent 7½; wing 2¾; tail 1.80.

Habitat.—Eastern United States, from southern New York and southern New England southward. In winter, Mexico and Guatemala.

This beautiful little warbler usually arrives in Pennsylvania early in May, but I have on two or three occasions seen individuals in Chester county as early as the 27th of April. The Blue-winged Warbler is a common summer resident in southeastern Pennsylvania, where it re-

* Am. Nat., Vol. 3, December, 1869, p. 556.

† Birds of this genus have elongated, conical, very acute and unnotched bills, the outlines of which are nearly straight; no rictal bristles; tail nearly even or slightly emarginate.

mains until about the first week in September. It appears from my own observations, as well as from the reports received through various observers, that this species is quite rare, or not found in most of the northern counties, and it also seems to be unknown in the higher mountainous districts. I have seen or heard these birds during the summer months in Crawford, Erie, Mercer, Lawrence, Beaver and Washington counties, where I have no doubt they breed sparingly at least. In July, 1889, I saw two with young in Clarion county, along the Clarion river. When the apple and pear trees are in blossom these yellow-vested insect hunters, singly, or in pairs, frequently visit orchards and gardens, but at other times they rarely, according to my observation, are seen about the habitations of man. They prefer to dwell in sequestered thickets, and bushy places in open woodland, and commonly their summer home is in the vicinity of a swamp or near a stream. Like the Worm-eating Warbler, this species subsists, to a considerable extent, on spiders, larvæ and beetles.

Helminthophila chrysoptera (Linn.).

Golden-winged Warbler.

Description.

Size about the same as *H. pinus*. Female very similar to male but duller. Bill (dried skin) black; legs dark brown.

Male.—Crown and large wing patch (wing-bars) golden-yellow; rest of upper parts slaty-blue; below white or whitish; showy stripe on side of head, front and back of eye, and patch on chin, throat and fore part of breast, black—the broad eye-stripe is bordered above and below with white; inner webs of three lateral tail-feathers mostly white; the sides of body are pale grayish or ashy.

Habitat.—Eastern United States; Central America in winter.

The Golden-winged Warbler arrives in Pennsylvania late in April or early in May from its winter home in the tropics. This bird, although a regular migrant both in spring and fall, is one of the group which is regarded as being particularly rare and desirable to the collector. I am inclined to believe that this warbler, occasionally at least, breeds in the western part of our state. July 27, 1889, I saw two of these birds in a swampy piece of woodland along the Allegheny river in Armstrong county, and on the 30th of the same month I killed a male feeding on the ground in a bushy thicket along the Ohio in Beaver county. The late Prof. S. F. Baird obtained one of these warblers in the early part of July in the vicinity of Carlisle, Cumberland county, and Mr. Roddy of Lancaster county, has, he informs me, observed it in summer. When migrating the Golden-wings, like many others of the family, visit orchards, but usually these warblers are to be found in thickets or woods. Three of these birds which I have examined had in their stomachs beetles, spiders and larvæ.

NOTE.—Dr. Spencer Trotter, formerly of Philadelphia, now residing at Swarthmore College, Delaware county, mentions (*Bull. Nutt. Orn. Club, II, 1877, pp. 79–80*) the capture of a male Brewster's Warbler (*H. leucobronchialis, Brewst*) by Christopher D. Wood, "May 12, 1877, in an apple orchard near Clifton, Delaware county." Although I do not now have the data at hand, my impression is that since the date above mentioned one other example of this possibly tenable species has been captured in southeastern Pennsylvania. Personally, I am unacquainted with this bird, concerning which the following is quoted from Dr. Coues' *Key, p. 293:* "Like *H. chrysoptera:* but a black bar through the eye as in *pinus*, and lacking the black breast patch of *chrysoptera*, the entire under parts being white; thus *chrysoptera X pinus*, and doubtless a hybrid between the two, though up to date a dozen or more specimens have been described, from New England, New York, Pennsylvania and Michigan."

Helminthophila ruficapilla (WILS.).

Nashville Warbler.

DESCRIPTION.

Length 4½ to 5 but generally less than 5; extent about 7½ (the average of five specimens in flesh); wing a little less than 2½ (six specimens average 2.37); tail little under 2 (about 1.90). Bill (dried specimens) brownish (mandible and edges of maxilla paler); tarsi brownish; feet lighter. *No* wing-bars or *no* white patches on tail feathers; lores yellowish (sometimes ashy or grayish) but *not* black; *no* superciliary stripe, but a conspicuous yellowish-white ring around eye. Plumage of upper parts olive-green, brightest on rump; upper surface of wings (on most coverts and edges of outer webs) and outer webs of tail feathers above (especially edges) similar to rump but a little paler; neck behind, sides of head, sides of neck and upper part of back, ashy-gray; top of head similar, but the ashy-gray tips of feathers of crown when pushed aside reveal a chestnut patch. Edge of wing, chin, throat, breast, and under tail-coverts yellow; belly paler; sides greenish-yellow.

Habitat.—Eastern North America to the plains, north to the Fur Countries, breeding from the northern United States northward. Mexico in winter.

This species usually is first seen in the southern part of Pennsylvania about the 10th of May; often in orchards, but generally about bushes, thickets or in open woodland, in the vicinity of streams and ponds. When migrating in the fall the Nashville Warbler is found here from about the middle of September until, some seasons, as late as the middle of October. In spring I have mostly observed these birds singly or in pairs, sometimes in company with other species, but generally by themselves. In the fall they are usually seen in small parties, and are then often with other warblers. Willow trees along streams and on the banks of ponds, appear to be their favorite feeding resorts, as they leisurely migrate southward. I believe this species breeds sparingly in our higher mountainous regions. Food similar to that of other species of its genus.

Helminthophila celata (Say.).

Orange-crowned Warbler.

DESCRIPTION.

"Above grayish olive-green, rather brighter on the rump. Beneath entirely greenish yellowish-white, except a little whitish about the anus; the sides tinged with grayish-olivaceous. A concealed patch of pale orange-rufous on the crown, hidden by grayish tips to the feathers. Eyelids and an obscure superciliary line yellowish-white, a dusky streak through the eye. Inner webs of tail feathers broadly edged with white.

"*Female* with little or none of the orange on crown, and the white edgings to inner webs of tail feathers.

"*Young* lacking the orange entirely, and with two fulvous-whitish bands on the wings. Length 4.70; wing 2.25; tail 2.00."*—*Hist. N. Am. B.*

Habitat.—Eastern North America (rare, however, in the northeastern United States), breeding as far northward as the Yukon and Mackenzie river districts, and southward through the Rocky mountains, and wintering in the south Atlantic and Gulf States and Mexico.

The Orange-crowned Warbler occurs in Pennsylvania as a very rare and irregular straggler, during the spring and fall migrations. A fine male was shot by the late C. D. Wood, November 2, 1867, in Bucks county. Dr. Spencer Trotter records † the capture of a specimen in Philadelphia county. I have never met with this species.

Helminthophila peregrina (Wils.).

Tennessee Warbler.

DESCRIPTION.

Length 4.71 (average of four adult males); extent 7¾ (two males); wing 2.65 (average four males); tail 2 or a little less. The female is a trifle smaller. Bill (dried specimens) maxilla blackish; mandible paler; legs blackish, feet brownish-yellow. Upper parts olive-green, brightest on rump; top and sides of head and neck, more or less ash-gray in some specimens; below chiefly white; lores dusky; a whitish ring around eye, and a line of same above it; outer tail feather has an obscure white spot on edge of inner web near end. Specimens taken in the fall have most of ash-gray of head and neck replaced with olive-green, and the lower parts, except under tail-coverts and patches on abdominal region which are white, are greenish-yellow.

Habitat.—Eastern North America, breeding from northern New York and northern New England northward to Hudson's Bay territory; Central America in winter.

The Tennessee Warbler, according to my observation, is found in eastern Pennsylvania as a very rare straggler during the spring migration, but in the autumn (September) it is often common, frequenting apple orchards, woods and thickets. Although sometimes found quite plentifully as an autumnal sojourner in the eastern portions of the state, I do not regard it as a regular fall migrant east of our principal mount-

*"Average of five adult males: wing 2.50; tail 2.04; culmen .41. Average of two adult females: wing 2.34; tail 1.98; culmen 40."—*Ornithology of Illinois. p. 129.*

† Bull Nut. Orn. Club. Vol. IV 1879. p. 235.

Bartramian Sandpiper.

ain ranges, as some seasons none of this species are to be observed. From reports received from observers in the western counties of Pennsylvania beyond the Alleghanies, I find that the Tennessee Warbler is mentioned as a regular migrant both in the spring and fall. When found here these warblers are seen generally in flocks and are often in company with other species. In addition to feeding on different forms of insects, especially plant-lice and small beetles, the Tennessee Warbler also occasionally eats small seeds and berries.

GENUS **COMPSOTHLYPIS** CABANIS.

Compsothlypis americana (LINN.).

Parula Warbler; Blue Yellow-backed Warbler.

DESCRIPTION (*Plate 97*).

Bill rather stout, conical and acute, and gently curved along culmen; maxilla mostly blackish, but its edges and the mandible paler or yellowish (in dried skins); legs yellowish-brown; the indistinct notch of mandible is best seen with a magnifying glass; rictal bristles inconspicuous. General color above blue; a triangular greenish or brownish-yellow patch on middle of back; wing-band white; two outer tail feathers on either side with white spots on inner webs; chin, throat, breast, yellow the breast in some individuals reddish-brown; rest of lower parts white.

Habitat.—Eastern United States, west to the plains, north to Canada, and south in winter to the West Indies and Central America.

Summer resident from early in May until about the last week in September. Although this species breeds quite generally throughout the state in damp forests and swampy wooded thickets, where the long tufts of gray lichens (*Usnea barbata* and its varieties), in which it builds, are abundant, I have observed these pretty little warblers to be more plentiful in the northern and eastern portions of the state during the summer than elsewhere. When migrating the Parula Warbler is frequently found in orchards and gardens as well as in woodland. This species feeds largely on spiders, caterpillars, small flies, and coleopterous insects, and they also devour numerous aphides.

GENUS **DENDROICA*** GRAY.

Dendroica tigrina (GMEL.)

Cape May Warbler.

DESCRIPTION.

Length 5¼; extent 8¼; wing 2¾; tail 2.15. Bill and legs black; the lower mandible in autumnal specimens (dried skins) is somewhat paler than the upper; bill rather

* This genus is the largest, as regards the number of species, of any in the state. All of these birds, as far as is known, with one exception, nest in trees and bushes. The Yellow Palm Warbler nests "on the ground in open situations." Many of these small, sprightly and ever active insect hunters, are among our most beautiful and pleasing visitors during their vernal and autumnal passages, to and from more northern breeding grounds, or in the summer months. The Yellow Warbler (*Dendroica æstiva*) has inner webs of outer tail feathers yellow; the other species of this group have rectrices (tail feathers) blotched or spotted (usually only on inner webs) with white. The coloration of the sexes in a number of species is greatly different; the adults of the same species in some instances are not only different in both the spring and fall attire, but some of them differ considerably from their young.

slender very acute; obsoletely notched near end, and commisure slightly arched or curved.

Male in spring.—Top of head blackish; back yellowish-olive, with faint dusky streaks anteriorly; rump, sides of head and neck and under parts yellow (under tail-coverts in two specimens before me are nearly white), ear-patch, chestnut, chin and throat often tinged with same; throat, anterior part of breast and sides with rather narrow black streaks; a yellowish line over eye extends to chestnut ear-coverts; blackish loral line; white wing patch (this is smaller in female); inner webs of three outer pairs of tail feathers have white patches on inner webs (these patches are small or obscure in female). The female is rather similar to male but lacks the conspicuous head markings (the male in fall also has chestnut head markings indistinct).

Habitat.—Eastern North America, north to Hudson's Bay territory, west to the plains, breeds from northern New England northward, and also in Jamaica; winters in the West Indies.

Rather rare and irregular spring migrant, but some seasons tolerably common in the spring. Arrives in Pennsylvania usually about the middle of May, when for a few days they are to be found in forests (usually in tops of trees) and sometimes in orchards. When migrating southward in the fall (September generally) these warblers are much more plentiful than in the spring, and they frequently are observed in low trees in woods, or in bushes, and occasionally on the ground along the roadsides or about the margins of woods. Food—larvæ, flies, plant-lice, small beetles, etc.

Dendroica æstiva (Gmel.).

Yellow Warbler.

Description (*Plate 41*).

Length about 5¼ inches; extent about 7½; bill bluish-black; legs and feet pale brown.

Male.—Golden-yellow; back olive-yellow; chest and sides streaked with brownish-red *not* black or dusky; wings and tail dusky; the inner webs of outer tail feathers with large blotches of yellow *not* white. Female and young duller, and the former with brownish-red streaks very obscure or entirely wanting.

Habitat.—North America at large, south in winter to Central America and northern South America.

Abundant summer resident. Arrives the last week in April and remains until about the middle of September. A common inhabitant of shrubbery in gardens, lawns, and parks, and also frequents orchards; it is often seen in groves but is rarely observed in forests. Builds a small compact cup-shaped nest of plant-fibers, spiders' webs, lined with woolly plant substances, feathers or hair, in an upright fork of a tree or bush. In this locality pear trees and bushes in hedge-rows are favorite breeding places. This bright and pleasing little songster may frequently be observed in trees and bushes or on telegraph wires along the roadsides. With us the Yellow Warbler, according to my observations, subsists exclusively on various forms of insect-life, especially small beetles, plant-

Great Blue Heron.

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lice, flies, spiders, ants and larvæ. It is stated, however, that this species often feeds on small seeds and berries.

Dendroica cærulescens (Gmel.).

Black-throated Blue Warbler.

Description (*Plate 97, male and female*).

Length about 5½; extent 8.

Male adult.—Uniform blue above; no white wing-bars but basal portion of primaries (other than first) white, forming a conspicuous patch; lores, a narrow frontal line and plumage on sides of head, sides of breast, chin, throat and sides, deep black; rest of under parts white; outer tail feathers spotted on inner webs with white (these spots in female, and the young, in fall are much restricted). Bill blackish; legs (dried skins) brownish, but in autumnal specimens are often much paler.

Female.—Grayish olive-green above; tail and wings, especially the former, with a bluish cast; lores and ear-patches dusky; a pale whitish line from nostrils above and back of eye; eyelids whitish; white patch on primaries as in male but smaller; white spots on tail feathers indistinct; chin, throat, breast and rest of under parts dull (soiled) yellow.

Habitat.—Eastern North America to the plains, breeding from northern New England and northern New York northward, and in the Alleghanies to northern Georgia; West Indies in winter.

The Black-throated Blue Warbler occurs generally throughout Pennsylvania only as a passing visitor in the spring and fall. Dr. Van Fleet has found this warbler breeding in Clarion and Clearfield counties, and Prof. A. Kock has observed it as a regular summer resident of Lycoming county. I have repeatedly seen these birds in the mountainous regions in different sections of the central and northern parts of the state, and there can be no doubt but that they breed regularly in nearly all our higher mountainous regions. The female of this species, although considerably different from the male in his showy coat of blue, black and white, can always be known by the white patch at base of primaries.

Dendroica coronata (Linn.).

Myrtle Warbler.

Description (*Plate 98, male*).

Rump, crown and sides of breast yellow, in all plumages more or less distinct. Length (average of six specimens) male 6 inches; extent (three specimens in flesh) 9½; wing 3 or a little less. Female somewhat smaller; bill and legs black.

Male, in spring.—Above slate-blue, streaked with black; two wing-bands white and inner webs of outer tail feathers spotted with same; lores and sides of head, and most of breast and sides (except as above mentioned) black; chin, throat, eyelids and superciliary line, and belly white.

Female.—Similar but much duller. Autumnal specimens are chiefly brownish above, with blackish streaks; below much lighter and quite thickly streaked.

Habitat.—Eastern North America, chiefly, straggling more or less commonly westward to the Pacific; breeds from northern United States northward, and winters

from Middle States (rarely seen in Pennsylvania) and the Ohio valley southward to the West Indies and Central America.

The Myrtle Warbler, also called Yellow-rump and Yellow-crown, is the most abundant of all the family occurring in this state. It is one of the first to arrive from the south; small flocks being often observed in the southern parts of Pennsylvania early in April. During mild winters doubtless a few of these warblers remain along our southern borders. I have several times seen individuals of this species in company with sparrows, in different parts of Maryland, Delaware and West Virginia, in winter when SNOW was on the ground. My friend, Robert Ridgway, writing of the Mrytle Warbler in southern Illinois,* says: "It may often be seen in midwinter, when the ground is covered with snow, in the door-yards along with Snow-birds (*Junco hyemalis*), Tree Sparrows and other familiar species, gleaning bread crumbs from the door-steps, or hunting for spiders or other insect tid-bits in the nooks of the garden fence or the crevices in the bark of trees; and at evening, flying in considerable companies, to the sheltering branches of the thickest tree tops (preferably evergreens), where they pass the night. Not unfrequently, however, they roost in odd nooks and crannies about the buildings or even in holes in the straw or hay-stacks in the barn-yard. A favorite food of this species are berries of the Poison-vine (*Rhus toxicodendron*), and during the early part of winter large numbers of them may be seen wherever vines of this species are abundant."

Although I have never found the nest of the Yellow-rump in this state, I believe that future research will show that it breeds regularly, but sparingly, in some of our secluded and higher mountainous districts. I have seen on different occasions, as noted on a previous page, birds of this species in the summer months; and have also observed single birds or small detached flocks late in August and early in September, in Chester, York and Juniata counties, whence they doubtless had come from some comparatively near breeding place. The food of the Myrtle Warbler, in spring, is composed mainly of insects, especially beetles, spiders, flies, aphides, etc., and in the late fall and winter, in addition to numerous kinds of insects, this bird often eats various kinds of berries. I have found in their stomachs remains of wild grapes, cedar berries and seeds of other berries. In Florida I have seen Myrtle Warblers feeding on Palmetto berries.

Dendroica auduboni (TOWNS.).

Audubon's Warbler.

DESCRIPTION.

Similar to *D. coronata*, from which it differs chiefly in having throat *yellow; no* white superciliary line; sides of head lead color; male has large white wing patch; female two white wing-bands.

* Nat. Hist. Survey of Ill., Vol. 1, Orn., p. 141.

Habitat.—Western United States, east to the western border of the plains; south in winter to Guatemala. Accidental in Pennsylvania and Massachusetts.

On the 8th of November, 1889, I captured a fine adult female of this species in an apple orchard in Chester county. This is the only specimen of this decidedly western bird that has ever been taken in Pennsylvania, and but one other specimen * of Audubon's Warbler has been recorded east of its common range. I found this bird in company with some Snow-birds (*Junco hyemalis*) and White-throated Sparrows. In its stomach a few seeds and fragments of beetles were found. The feathers about its bill were more or less soiled evidently by juices of berries on which it had been feeding.

Dendroica maculosa (Gmel.).

Magnolia Warbler.

Description (*Plate 94, Male*).

Length (average of seven males) 4.90; extent (average of seven males) 7.35; wing (average of seven males) 2.40. Female usually somewhat smaller.

Male, in spring.—Bill and legs blackish; crown grayish slate-blue; black feathers of forehead and lores continuous with a black streak below and a wider one behind eye that joins the triangular black space on back (the black back feathers are in many specimens edged with yellowish-green) below bright yellow streaked or blotched (except on chin, throat and middle portion of abdomen) with black; under tail-coverts white; all tail-feathers, except central pair, have white spots on inner webs in middle; rump yellow; two wing bars or a white patch; upper tail-coverts black; white streak back of eye.

Female similar but much duller. The young are quite different. Top of head and neck behind ashy-gray, back greenish-olive; upper tail-coverts black, with extensive grayish edgings; below chiefly yellow, the streaks of black being mainly on sides, can be recognized by peculiar white tail markings previously described, the yellow rump and under parts; maxilla brownish; mandible yellowish, and legs paler than in adult.

Habitat.—Eastern North America to the base of the Rocky mountains, breeding from northern New England, northern New York and northern Michigan, to Hudson's Bay territory. In winter, Bahamas, Cuba and Central America.

This active and beautiful warbler arrives in Pennsylvania early in May and departs in September. Inhabits woodland chiefly, but often when migrating is seen in orchards and gardens. As a bird of passage it is quite common and very generally distributed throughout the state; and it also breeds regularly, but not abundantly, in many sections of the mountain districts. I have seen Magnolia Warblers, in midsummer, in the mountains of Blair, McKean and Cameron counties, and their nests have been found in Crawford, Sullivan and Somerset counties, where, I am reliably informed, they breed regularly. The Magnolia Warbler can easily be recognized by its showy dress of black and yellow and the conspicuous broad white band on middle of tail feathers. Mr. Ridg-

* A male *D. audubonî* was captured by Mr. A. M. Frazer at Cambridge, Mass., November 15, 1876.—*Birds Col. Valley, p. 273.*

way, * writing of this species, very aptly says, "it is one of the most agile of its tribe, its quick and restless movements being more like those of the Redstart than those of its nearest kindred." Food consists largely of various small winged insects; plant-lice, ants and spiders are also fed upon to a considerable extent.

Dendroica cærulea (WILS.).

Cerulean Warbler

DESCRIPTION.

Length 4½ to 5; extent about 8½ inches.

Male, in spring.—Above bright blue, streaked with black; the crown somewhat brighter and darkest; below white; the breast and sides with blue or bluish-black streaks; two white wing bars; tail-feathers, except central pair, with white patches on inner webs, near the end.

"*Female.*—Greenish-blue above, brightest on the crown; beneath white, tinged with greenish-yellow, obsoletely streaked on the sides; eyelids and a superciliary line greenish-white." (*Hist. N. Am. B.*)

Habitat.—Eastern United States and southern Canada to the plains. Rare or casual east of central New York and the Alleghanies. Cuba (rare) and Central America in winter.

The Cerulean or Blue Warbler I have found in eastern Pennsylvania only as a very rare spring and fall migrant. During the last ten years I have seen but five of these birds, one was observed in an apple orchard in May, the others were all seen in the tops of tall forest trees. In the western counties of the state this species is reported to be tolerably frequent during migrations, and Dr. Van Fleet says it breeds in Clinton county; and in Somerset county Dr. H. D. Moore has noted it as a rare summer visitor. The viscera of two individuals which I have examined contained spiders and small beetles, etc.; the stomach of one bird was destitute of all food except portions of a wasp-like insect.

Dendroica pensylvanica† (LINN.).

Chestnut-sided Warbler.

DESCRIPTION (*Plate 73, Fig. 3, Male*).

Length about 5; extent about 7¾ inches.

Male, in spring.—Above greenish-olive and pale bluish-gray (the latter especially on back of neck) streaked with black; top of head yellow, with black border (in some specimens feathers of forehead and those above the black lores and eyes are whitish); broad triangular patch below eye from base of mandible black, and from this a narrow black line joins the showy chestnut stripe which extends back along sides to flanks; ear-coverts and portion of sides of neck, and rest of under parts pure white, two yellowish wing-bands; three outer pairs of tail-feathers white on inner webs towards end.

* Ornithology of Illinois.—*Ridgw.*

† The bill in this species, and also in *D. castanea*, is broader, and the bristles are longer than in others of the genus.

Pileated Woodpecker.

1. Male; 2. Female.

Female.—Similar to male, but more greenish-yellow above, but streaked with black; the black head markings are usually absent, sometimes very indistinctly shown on malar region or about eyes; a whitish ring about eye; the chestnut streak is much restricted.

Young.—Well marked *yellow wing-bands*; upper parts yellowish-green with or without dusky streaks; sides of head, sides of neck and backward grayish-ash, rest of lower parts white, with or without traces of chestnut stripe on sides.

Habitat.—Eastern United States and southern Canada, west to the plains, breeding southward to central Illinois and the Appalachian highlands probably to northern Georgia. In winter south to Bahamas, eastern Mexico, Central America, etc.

Regular spring and fall migrant, arriving about the first week in May and departing in September. This species is usually much more numerous in the fall than during the vernal migration. In the spring this handsome little warbler is generally most frequently to be found in woods or thickets; but occasionally he also is seen in orchards seeking insects among the fragrant rose-tinted blossoms. I have seen birds of this species, in the summer, in the counties of Chester, Delaware, Lancaster, Wayne, Susquehanna, Blair, Columbia, Mercer, Cameron and McKean, where I have no doubt this bird breeds regularly* but sparingly. From reports received from observers in nearly all parts of the state, especially in the upper half, I find this bird breeds regularly (but no place is it mentioned as being common) in nearly all parts of the commonwealth. Feeds on various larvæ, small beetles, and other insects. Once, late in July, I shot a male Chestnut-sided Warbler in a thicket near West Chester, the feathers of its chin and throat were stained with what appeared to be the juice of a blackberry, possibly this species sometimes feeds on berries.

Dendroica castanea (Wils.).

Bay-breasted Warbler.

Description (*Plate 73, Fig. 2*).

Length about 5½; extent about 8¾.

Male, in spring.—Forehead and sides of head black; crown dark-chestnut; back thickly streaked with black and grayish; chin, throat, forebreast and sides chestnut, duller than crown; under tail-coverts pale buff; rest of lower parts, also a patch behind ears, pale yellowish-white; two white wing-bars; two outer tail-feathers with white spots near end, and others also whitish on inner edges. Female is more greenish-brown above, streaked with black; traces of chestnut on crown and lower parts; bill and legs blackish.

Habitat.—Eastern North America, north to Hudson's Bay. Breeds from northern New England and northern Michigan northward; winters in Central America.

Irregular spring and fall migrant, usually more plentiful in the fall. Perhaps the Bay-breasted Warbler is more numerous than it is generally admitted to be. During their brief visits in this region I have noticed that these warblers are usually to be observed in the topmost branches of tall forest trees, particularly in oaks, chestnuts and hickories. Food

* In 1872, Dr. J. C. Merrill, of Philadelphia, found this species breeding and quite common in Monroe county.

of five of these birds which I have examined, consisted of beetles, larvæ and flies.

"The females and immature males of this species differ much from the spring males, and are often confounded with other species, especially with *D. striata.* A careful comparison of an extensive series of immature specimens of the two species shows that in *castanea* the under parts are seldom washed uniformly on the throat and breast with yellowish-green, but while this may be seen on the sides of the neck and breast, or even across the latter, the chin and throat are nearly white, the sides tinged with dirty brown, even if the (generally present) trace of chestnut be wanting on the sides. There is a buff tinge to the under tail-coverts; the quills are abruptly margined with white, and there are no traces (however obsolete) of streaks on the breast. In *D. striata* the under parts are quite uniformly washed with greenish-yellow nearly as far back as the vent, the sides of the breast and sometimes of the belly with obsolete streaks; no trace of the uniform dirty reddish-brown on the sides; the under tail-coverts are pure white. The quills are only gradually paler towards the inner edge instead of being abruptly white."—*Ridgw. Orn. of Ill.*

Dendroica striata (Forst.).

Black-poll Warbler.

Description.

Length about 5¾; extent 8½ to 9¼ inches. Maxilla brownish; mandible paler; legs and feet yellowish.

Male, in spring.—Upper half of head, on a level with middle of eye, also nape, pure black; sides and back of neck white streaked with black; upper parts generally ash-gray thickly streaked with black; two white wing bars; two outer pairs of tail-feathers with conspicuous white spots on inner webs near ends; lower half of head including ear-coverts white; median under parts white, streaked and spotted with black from chin along sides of neck back to tail.

Female greenish olive above (including crown) streaked with black; lower parts streaked as in male, yellowish ring about eye, and the white of lower parts, especially on breast, in nearly all specimens is tinged with yellowish; dusky streak in front of and behind eye. The fall plumage is very different. Above light olive-green indistinctly streaked with dusky; below white and yellowish with or without streaks; but both old and young in any plumage have *white* lower tail-coverts, not pale buff as in *D. castanea.*

Habitat.—Eastern North America to the Rocky mountains, north to Greenland, the Barren Grounds, and Alaska, breeding from northern New England northward. South in winter to northern South America.

Abundant spring and fall migrant; frequents forests and orchards, and shade trees in the streets, parks and lawns. Individuals of this species have been observed here (Chester county) sometimes as late as the 12th of June. The Black-poll Warbler breeds most abundantly in the far north; its nests, eggs, and young have been found by Mr. E. W. Nelson in

Alaska, and by Mr. L. M. Turner in Labrador and Ungava. Mr. E. W. Nelson,* writing of this species, says: "It is stated that it usually builds its nest in bushes, a few feet from the ground, but some Arctic nests are placed directly upon the ground. This variation in habit probably accords with the locality, since it nests in bushes when the latter are to be found."

This species is generally seen singly or in pairs, but sometimes small detached flocks are to be met with. Feeds on beetles, flies, aphides, spiders and canker-worms. Has a rather sharp lisping and somewhat squeaky note. "Dr. Bryant met with it in the Bahamas, in the spring of 1859, where it was abundant from the 1st to the 10th of May. He describes its habits as similar to those of the *Mniotilta varia* (Black and White Warbler), climbing around the trunks of trees in search of insects with the same facility. * * * Dr. Coues found it abundant in Labrador in all well-wooded situations, and describes it as a most expert flycatcher, taking insects on the wing in the same manner as the *Contopus virens* (Wood Pewee)."—*Hist. N. Am. Birds.*

Dendroica blackburniæ (Gmel.).

Blackburnian Warbler.

Description (*Plate 98, male*).

Top of head with a central spot of yellow; yellowish (sometimes whitish) and indistinct in young. Length 5½; extent about 8½.

Male, in spring.—Outer tail-feathers, except ends, chiefly white; white wing patch; middle of crown with a patch of orange; rest of upper parts chiefly black; back streaked more or less with grayish, whitish and yellowish; black area in front of eye; ear-coverts blackish; between the black streak below the eye and the eye is a bright orange spot; chin, throat, forebreast, and superciliary line, orange-red brightest on throat and breast; rest of lower parts white, more or less tinged with yellow; sides streaked with black.

Female quite similar, but paler. Autumnal specimens are much duller and have two wing bars; the females and young especially are more brownish, olive above and the streaks below are much less distinct; the bright-colored throat and breast of female is duller, and the yellow is only clearly shown on chest of young male.

Habitat.—Eastern North America to the plains, breeding from the northern and more elevated parts of the eastern United States northward; in winter, south to Bahamas, Central America, etc.

The Blackburnian Warbler is a regular and tolerably plentiful spring and fall migrant, arriving in Pennsylvania from the 10th to the 15th of May, and departing in September. This species breeds rather sparingly but regularly in the mountain regions of our state, and, occasionally, individuals have been observed during the summer months in the southeast and also in some of the western counties. Dr. W. Van Fleet informs me this bird breeds "quite plentifully in Clinton, Clearfield and Northumberland counties," and Prof. August Kock has found this beau-

* Rept. upon Nat. Hist. Coll. made in Alaska, p. 203.

tiful warbler as a regular and moderately common summer resident in the mountainous districts of romantic Lycoming county. Its nests have been taken, it is said, in low bushes in Crawford county. I have taken several of these warblers in Centre, McKean and Susquehanna counties late in June and early in August. This species is generally found in woods or thickets, but often, when migrating (especially in spring), these birds visit orchards. Commonly seen singly or in pairs, but occasionally in spring I have seen companies of six to eight together and in one instance a dozen of these bright orange-throated beauties were observed feeding together in a couple of beech trees in a woods along the Youghiogheny river in Fayette county. Food about the same as that of the Black-poll.

Dendroica dominica (Linn.).

Yellow-throated Warbler.

Description.

Sexes (adults) alike. Length about 5¼; extent about 8½. Bill and legs black. Bill is long, measuring along exposed culmen .48 (average of six specimens), much compressed and sharp pointed; maxilla somewhat curved. Above plain bluish-gray and unstreaked; edges of middle and greater coverts form two white wing bands; inner webs of three pairs of outer tail-feathers spotted with white toward the end. Top of head to about middle of eyes black; lores and patch on sides of head, continuous with patch on sides of neck, deep black; a white spot below eye is encircled by black which borders the bright yellow throat patch; six specimens before me have yellow of chin separated from bill by a few white feathers; white area on side of neck separating black from bluish-gray; under parts, except as already mentioned, white, conspicuously streaked on sides with black. A long stripe runs from base of maxilla to nape, this stripe from bill and almost reaching the eye is usually yellow, then it becomes pure white.

Habitat.—Southeastern United States, north to the Middle States, and rarely to southern New England; south in winter to the West Indies.

The Yellow-throated Warbler is a very rare and irregular summer visitor in the southeastern part of Pennsylvania. Dr. W. P. Turnbull includes this species in his list of stragglers in the lower counties of eastern Pennsylvania. The late C. D. Wood, of Philadelphia, showed me a pair of these warblers which he had captured about the middle of June in Delaware county. I have in my collection two specimens shot in Chester county, both are males, one was taken June 27, 1879, the other July, 1885. It is possible that this southern bird occasionally breeds within or near our southern borders. In the numerous reports which I have received from various observers in different parts of Pennsylvania no mention is made of the Yellow-throated Warbler. In the winter of 1885 I found this species in small flocks and quite abundant in pine, palmetto and oak trees at different points along the St. John's river, from Palatka southward to Sanford. Feeds on beetles, larvæ, ants, spiders, etc.

Dendroica virens (Gmel.)

Black-throated Green Warbler.

Description (*Plate 97, male*).

Length about 5; extent about 8.

Male, in spring.—Top of head, neck behind, scapulars back and rump bright yellowish olive-green; wings and tail dusky; wings have two white bars and considerable white edging, and the outer tail feathers are principally white. In some specimens the back has a few concealed blackish streaks; a dusky streak from maxilla back through eye and auriculars, and another one below it. Forehead, superciliary stripes (the latter extending to nape), sides of head and neck rich yellow; chin, throat and upper breast jet black, which is continued along sides in streaks; rest of under parts yellowish-white. Bill and legs blackish, paler in young and autumnal specimens.

Female.—Similar to male but duller and the jet black of chin, throat and breast is absent, or at least largely hidden by yellowish and whitish ends of feathers; but black always is more or less evident on forebreast.

Young.—In fall resembles greatly the female.

Habitat.—Eastern North America to the plains, north to Hudson's Bay territory, breeding from the northern United States northward. In winter, south to Cuba and Panama.

The Black-throated Green Warbler is a common and familiar visitor occurring generally throughout the state when migrating, and as a summer resident it is frequently met with in the wooded regions of our higher mountain ranges. Although this warbler often visits orchard and other trees about the habitations of man, it is to be found most abundantly during migrations in woodland. It frequents the tops of the forest monarchs, as well as the lower limbs of trees and bushes. Although these sprightly and showily-attired birds may be observed in any or all kinds of trees in the woods, I have noticed that where hickory and oak trees are growing, there you will generally find the present species most numerous. Prof. August Kock informs me that this bird breeds regular in Lycoming county, in the neighborhood of Williamsport. Dr. Van Fleet says it breeds rather plentifully in Clinton, Clearfield and Northumberland counties. Prof. H. J. Roddy, of Millersville, has captured specimens at Bush mountain, Centre county, late in July, so young as to warrant him in believing that they hatched in that immediate vicinity. Mr. Sennett tells me this bird breeds in Crawford county, and I am quite certain that it is a native in all our northern tier of counties, as well as in many of the counties to the southward. Food consists largely of aphides, spiders, beetles, flies, larvæ, etc. Arrives in southern Pennsylvania usually about the last week in April, and occasionally straggling individuals are found along our southern borders as late as the middle of October.

Dendroica townsendi (NUTT.).

Townsend's Warbler.

DESCRIPTION.

"*Spring, male.*—Above bright olive-green, the feathers all black in the center, showing more or less as streaks, especially on the crown, where the black predominates. Quills, tail and upper tail-covert feathers dark-brown, edged with bluish-gray; the wings with two white bands on the coverts; the two outer tail-feathers white with a brown streak near the end; a white streak only in the end of the third feather. Under parts as far as the middle of the body, with the sides of head and neck, including a superciliary stripe and a spot beneath the eye, yellow; the median portion of the side of the head, the chin and throat, with streaks on the sides of the breast, flanks and under tail-coverts, black; the remainder of under parts white. Length 5 inches; wing 2.65; tail 2.25.

"*Spring, female.*—Resembling the male, but the black patch on the throat replaced by irregular blotches upon a pure yellow ground."—(*Hist. N. Am. B.*)

Habitat.—Western North America, east during migrations to western Colorado, north to Sitka, south to Mexico, and in winter to Guatemala. Accidental near Philadelphia (Chester county).

Accidental. An adult male of this decidedly western species, was shot by Mr. C. D. Wood, of Philadelphia, May 12, 1868, in an apple orchard, near Coatesville, Chester county. The specimen was sold ($40) to Dr. Turnbull, and after his death was purchased by Barney Hoopes, Esq., of Philadelphia, who subsequently disposed of it to the late John Krider, of Philadelphia.

Dendroica kirtlandi BAIRD.

Kirtland's Warbler.

DESCRIPTION.

"Male; upper parts slaty-blue; crown and back streaked with black; lores and frontlet black; eyelids mostly white. Under parts clear yellow, whitening on crissum, the breast with small spots and the sides with short streaks of black; greater and middle wing-coverts, quills, and tail-feathers edged with white; two outer tail-feathers white-blotched on inner web. Length 5.50; wing 2.80; tail 2.70

Adult female.—Upper parts dull bluish-gray, obscured with brownish on the hind neck and back, marked with heavy blackish streaks on the whole back; crown and upper tail-coverts with fine black shaft-lines. Sides of head and neck like upper parts, with darkened lores and whitish eye-ring. Wing quills dusky, with slight whitish edging of both webs; tail-coverts like back, but with large blackish central field, and whitish edging and tipping, forming two inconspicuous wing-bars. Tail-feathers like wing-quills only the outermost one having a small white blotch. Entire under parts dull yellow, brighter on breast, paler on throat and belly, washed with brownish on sides, with a slight necklace of brownish dots across the forebreast (as in *S. canadensis*); these spots stronger on the sides of the breast, whence lengthening into streaks on the sides and flanks; a few small sharp scratches of the same nearly across lower breast. Under tail-coverts white, unmarked. Bill and feet black. Length about 5.30; wing 2.60; bill .40; tarsus .80."—(*Key N. Am. Birds.*)

Habitat.—Eastern United States (Pennsylvania, Ohio, Missouri, Michigan, Wisconsin), and the Bahamas in winter.

Wild Pigeon. Mourning Dove.

1, 3. Males; 2. Female.

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About half a dozen specimens of this species have been taken in Ohio since the type was captured, May 13, 1851, near Cleveland, Ohio, by Dr. Jared P. Kirtland. I have never seen a Kirtland's Warbler in this state, and the only one that has ever been taken here, so far as I can learn, is now in the collection of Prof. H. J. Roddy, of Millersville State Normal School, Pennsylvania. Concerning this species, Mr. Roddy writes me as follows: "I shot a Kirtland's Warbler (*D. kirtlandi*), June 25, 1885, near Dublin Gap Springs, Pennsylvania." In the list of birds which accompanied Mr. Roddy's letter, Kirtland's Warbler is marked as a breeder, with the following note, "saw one (doubtless the one he shot June 25, 1885) and its family." During migrations this warbler has been found in the eastern United States as above noted; it has been taken in winter in the Bahamas, but of its summer residence naturalists know nothing.

Dendroica vigorsii (AUD.).

Pine Warbler.

DESCRIPTION.

Bill rather stout, blackish; legs brownish; bill in young is generally paler, especially mandible about base.

Length about 5½; extent 8¾.

Above bright yellowish-olive; sides of head and neck same color, superciliary stripe, spot under eye, chin, throat, breast, portion of sides, and upper part of abdomen yellow. The lower part of belly and under tail-coverts in six specimens before me, are dull white, and two other specimens have these parts as well as flanks tinged with yellow; sides of breast obsoletely streaked with dusky; wings and tail dusky grayish; the edge of outer webs of primaries edged with grayish-white, and two wing bands of same. The two outer pairs of tail-feathers have large white spaces towards the end on inner webs, and middle portion of outer web of first pair of lateral tail-feathers, is also white or grayish.

Female somewhat similar but duller, more grayish-olive above, less yellowish below.

Habitat.—Eastern United States, to the plains, north to Ontario and New Brunswick, wintering in the south Atlantic and Gulf States and the Bahamas.

The Pine Warbler, a regular though not a common migrant in the spring and fall, arrives in Pennsylvania late in April or early in May and departs usually in September.

By the last of October but few of these birds are met with in this state. I have, however, seen one or two of these warblers here in winter. Mr. Gentry mentions an instance where a stray individual was taken near Philadelphia in midwinter. The Messrs. Baird found this bird breeding in Cumberland county. I have taken, at different times, three Pine Warblers in midsummer in pine and hemlock woods in the mountainous regions, and have no doubt this species breeds regularly, but sparingly in our extensive coniferous forests. Prof. H. J. Roddy has found the Pine Warbler breeding in Perry county. The same observer has also seen this bird in the southern part of our state as a casual winter resident. Mr. Sennett has observed this bird in the Crawford-Erie

district only as a spring and fall migrant; Dr. Van Fleet has noted it in Clinton, Clearfield and Northumberland counties, likewise Prof. A. Kock in Lycoming county, only as a bird of passage in the spring and fall. Although occurring during migrations generally throughout the commonwealth, the present species is, according to my observation, oftener met with in the pine and hemlock woods than elsewhere. Like the Red-poll Warbler (*D. palmarum*, or its near relative *hypochrysea*) the Pine Warbler is frequently seen on the ground. Feeds, like other of its kindred, on divers kinds of insect life, and occasionally this diet is varied by a few small berries and seeds.

Dendroica palmarum (Gmel.).

Palm Warbler.

Description.

Length about 5½; extent about 8; above brownish-olive; back narrowly streaked with dusky; rump and upper tail-coverts yellowish-olive; top of head chestnut; tips of middle and greater wing-coverts paler than surrounding parts, but not forming distinct bars; inner webs of two outer pairs of tail feathers white to ends; superciliary stripe dull whitish or yellowish; lower eyelids whitish; under parts dull whitish and yellowish, the latter most conspicuous on throat, forebreast and under tail-coverts; breast and sides streaked with grayish-brown or pale reddish-brown; wings and tail-feathers dusky brown.

Habitat.—Northern interior to the Great Slave Lake; in winter and in migrations, Mississippi valley and Gulf States; including western and southern Florida and the West Indies. Casual in the Atlantic states.

D. palmarum hypochrysea, Ridgw. (Yellow Palm Warbler), is a little larger than true *palmarum*, from which it differs also in having under parts much brighter and almost *continuous yellow;* and the bright *reddish-chestnut* streaks in spring adults are almost wholly confined to the sides of breast and lower part of neck (sides); bill blackish; base of lower mandible paler; legs brownish; soles of feet yellow.

Habitat.—Atlantic states, north to Hudson's Bay. Breeds from New Brunswick and Nova Scotia northward; winters in the south Atlantic and Gulf States.

The Yellow Palm Warbler is the common form which I have found in Pennsylvania east of the Allegheny mountains. It also occurs west of the Alleghanies, where the Palm Warbler (*D. palmarum*) is reported as a regular spring and fall migrant. I have taken one or two birds in the autumn, in southeastern Pennsylvania, which appear to be good examples of *Dendroica palmarum*, but from a large series of skins before me I am thoroughly convinced that *Dendroica palmarum hypochrysea* is the common bird in eastern and central Pennsylvania and that *Dendroica palmarum* occurs in the eastern two-thirds of the state, and doubtless throughout the entire state chiefly as a rare visitor during migrations. These warblers arrive here usually about the 20th of April (some seasons individuals are seen as early as the first week in April in the southern parts of Chester, Delaware and Lancaster counties) and are commonly observed for about a week or ten days. Found generally on the ground, in fields, along fences and by the roadsides. In the autumn they return late in September, and frequent the same situations

as in the spring; they are often seen in company with different species of sparrows and also Yellow-rumped Warblers. Like others of its genus this warbler feeds on small beetles, larvæ, spiders, etc.

Dendroica discolor (Vieill.).

Prairie Warbler.

Description.

Length about 5; extent about 7½. Upper parts olive-green (some specimens olive-yellow), interscapular region with patch of reddish chestnut spots. Under parts, sides of head and streak from nostrils running back over and behind eye, two wing-bands and under parts, yellow; black streak in front of eye and another behind it black; sides of neck and body streaked with black; inner webs of outer tail-feathers mostly white. The female is similar but duller and reddish spots on back are indistinct.

Habitat.—Eastern United States to the plains; north to Michigan and southern New England. Winters in southern Florida and the West Indies.

The Prairie Warbler is a regular and tolerably common migrant in suitable localities in the eastern half of Pennsylvania. Arrives early in May and departs in September. Dr. Van Fleet, of Clinton county, and Prof. A. Kock, of Lycoming county, have never met with this species in their localities or in fact is it reported to occur, except in rare instances, in any of our higher mountainous districts. In Erie and Crawford counties Mr. Sennett has found the Prairie Warbler as a rare spring and autumnal visitor, and from reports received from other observers in western Pennsylvania this bird is either marked as "not found" or as a rare spring and fall migrant. From the fact that I have, on different occasions, during the summer months, seen Prairie Warblers in high grasses, tall weeds, cedar thickets and other bushy places in old fields on the Barren Ridge in the southeastern part of this state, I am of the opinion that it breeds regularly through not abundantly with us. Prof. H. J. Roddy has, he informs me, found this bird as a rare summer resident in Perry county. Food—flies, small beetles, larvæ, etc.

Genus **SEIURUS*** Swainson.

Seiurus aurocapillus (Linn.).

Oven-bird; Golden-crowned Thrush.

Description (*Plate 99*).

Length about 6; extent about 9½ inches; bill and eyes brown; legs flesh color. Above uniform olive-green with a tinge of yellow; crown with two black lateral

* "*Gen. Char.*—Bill rather compressed, with a distinct notch. Gonys ascending. Rictal bristles very short. Wings moderate (about three-quarters of an inch longer than the tail); first quill scarcely shorter than the second. Tail slightly rounded, feathers acuminate. Tarsi about as long as the skull, considerably exceeding the middle toe. Under tail-coverts reaching within about half an inch of the end of the tail. Color above olivaceous, beneath whitish, thickly streaked on the breast and sides; wings and tail immaculate. Nests on the ground, often arched or sheltered by position or dry leaves. Eggs white, marked with red, brown and purple. This genus is decidedly sylvicoline in general appearance, although the spots on the breast resemble somewhat those of the thrushes"—(*Hist. N. Am, B.*).

streaks, which extend from bill and enclose a golden or brownish-orange space; white ring around eye; beneath white; breast and sides streaked with dusky or black. The young at first have no stripes on top of head, and lower parts are light-dull brownish-yellow, with obscure dusky streaks.

Habitat.—Eastern North America, north to Hudson's Bay territory and Alaska, breeding from Kansas, the Ohio Valley and Virginia, northward. In winter, southern Florida, the West Indies and Central America.

This bird is a common summer resident, arriving here generally about the 25th of April and remaining until about the last week of September. Occasionally, but rarely, are birds of this species observed in the southern counties after the second week of October. During migrations it is often found in thickets, and occasionally is seen in yards and gardens. In the summer months it rarely is observed to leave its favorite retreats in dark and unfrequented localities in forests. The Oven-bird very carefully hides its rather bulky and loosely built nest in old leaves, by the side of a log or under the projecting edges of brush heaps; in addition to such protections, and to further conceal its treasures from the curious eyes of egg-collectors or other predatory animals, the top is usually covered over or roofed by the birds, who gain an entrance through an opening in the side. The eggs, four to six, are creamy-white, spotted with reddish-brown. They measure about .80 of an inch long and .60 of an inch wide. The song of this bird is exceeding loud, shrill and monotonous. Birds of this genus, when walking on the ground, have the habit of wagging their tails like the Spotted Sandpiper. The Oven-bird subsists chiefly on various forms of insect life, such as beetles, earthworms, crickets, flies, spiders and larvæ; it also sometimes feeds on small seeds.

Seiurus noveboracensis (Gmel.).

Water Thrush; Water Wagtail; Small-billed Water-Thrush.

Description (*Plate 95*).

Length about 6; extent about 9; eyes brown; bill small (rather slender as compared with next species), a half inch or less in length along culmen; upper parts uniform and dark olive-brown; below yellowish thickly and sharply streaked except on belly and under tail-coverts with dark olive-brown; these streaks on breast in some specimens are quite black; a yellowish superciliary line.

Habitat.—Eastern United States to Illinois, and northward to Arctic America, breeding from the northern United States, northward. South in winter to the West Indies and northern South America.

The Water Thrush is common and very generally distributed throughout Pennsylvania during migrations, or late in April, May, September and frequently individuals are found lingering as they pass southward, to winter it is said beyond the southern boundaries of the United States, in our southern counties late in October. Generally, however, the Water Wagtail, as many term this bird, is not found here after the last week in September. Like the sandpipers this bird may

1. Winter Wren. 2. Cat-bird.

be seen frequently in shallow water, on logs and stones, etc., about pools, swampy woods and creeks or ponds in thickets. The species is nearly always seen singly or in pairs; and occasionally it is found, when migrating, with Solitary Sandpipers, about sluggish streams or pools in open woods. The Water Thrush breeds regularly but is not numerous as a summer resident, in the northern parts of the state. Dr. W. Van Fleet tells me that it is a regular breeder in suitable localities in the mountainous districts of Clinton and Clearfield counties. Dr. John W. Detwiller, of Northampton, has taken their nests and eggs. Prof. Roddy says he has found the Water Thrush along cold mountain streams in every summer month and that in July, 1888, he saw a number in the Bear Meadows, Centre county. Prof. A. Kock writes that it occurs sparingly as a breeder about the mountain streams in Lycoming county. Mr. Sennett has repeatedly seen the species in the tamarack swamps and about small streams in woods in Crawford county, where it breeds regularly. The late Edmund Ricksecker recorded this thrush as a regular breeder in Monroe county. Food consists largely of beetles; small worms, larvæ, and small shells are also frequently eaten.

Seiurus motacilla (VIEILL.).

Louisiana Water-Thrush; Large-billed Water-Thrush.

DESCRIPTION.

Very similar to *noveboracensis* but a little larger, bill much stouter and a little longer. Under parts *white* with fewer and paler streaks; flanks and under tail-coverts (especially the latter) have a faint buffy tint; white superciliary line; chin, throat, abdomen and under tail-coverts unmarked.

Habitat.—Eastern United States, north to southern New England and west to the plains. In winter, West Indies, southern Mexico and Central America.

Of the three species of this genus the Louisiana Water-Thrush is the rarest. It frequents the same localities as the Small-billed Water-Thrush. I have never seen this species in the northern counties, and in but few of the reports which have been received from observers in the northern parts of the state do I find that it has been observed as a migrant. Mr. George B. Sennett has found the Louisiana Water Thrush in summer about streams in the vicinity of Meadville, Crawford county. Messrs. George Miller and Casper Loucks have found it breeding in York county; and I have taken a few specimens in Chester and other counties along our southern borders in summer. Food similar to that of the species last mentioned.

Genus GEOTHLYPIS* Cabanis.

Geothlypis formosa (Wils.).

Kentucky Warbler.

Description (*Plate 98*).

Length about 5½; extent about 9. Top of head black, the feathers edged posteriorly with grayish; the black lores join a broad black patch below eye and connecting with a streak of same on sides of neck; rest of upper parts greenish-olive; conspicuous superciliary stripe and under parts bright yellow.

Female similar but somewhat duller. The young have black obscure or absent.

Habitat.—Eastern United States, west to the plains, and north to southern New England and southern Michigan. In winter, West Indies and Central America.

This beautiful bird, readily mistaken in the bushes for the Hooded Warbler, is a summer resident in Pennsylvania, where it arrives usually about May 1st, and remains until, generally, the middle of September. As a well-known writer observes the Kentucky Warbler resembles in its manners the Water Thrushes, "having the same tilting motion of the body and horizontal altitude when perching, so characteristic of these birds"—(*Ridgway*). Although greatly like the Oven-bird in many of its ways it can easily be distinguished from the latter by its bright yellow and immaculate under parts. His song is also much more pleasing and different from that of the Oven-bird; the song, Mr. Ridgway† says, "recalls that of the Cardinal, but is much weaker, and its ordinary note is a soft *pchip*, somewhat like that of the Pewee (*Sayornis phœbe*)." Inhabits the thick undergrowth of low, damp and boggy woodland; in woods and well-sheltered swamps about the borders of forests where skunk-cabbage (*Symplocarpus fœditus*) and spice-wood bushes (*Benzoin odoriferum*) abound there you mostly will find these active, pugnacious and secretive songsters. Like the Oven-bird, this warbler nests on the ground, and although the bulky nest is not roofed over, it is equally as difficult to discover as that of the Oven-bird. Ten nests which I have found in Chester, Delaware and Clarion counties, have all been built in damp situations in woods. This species rarely, if ever, I think, nests on a dry hillside as the Oven-bird commonly does.

The Kentucky Warbler is a very common summer resident in different localities in southeastern Pennsylvania, being almost as numerous as the Maryland Yellow-throat, for which bird it is sometimes mistaken,

*Legs yellow in dried specimens, but in freshly killed specimens legs are pale flesh color, or light-brownish flesh color; the anterior part of tarsus is darker than posterior part. Bill distinctly notched at end; rictal bristles very short or absent; tail and wings without spots and bands or bars; eyes brown. The Connecticut and Kentucky Warblers (subgenus *Oporornis* of Baird) have moderately stout and rather lengthened bills, somewhat depressed at base and rather compressed, particularly in Kentucky Warbler, from about middle to end; wings, long and pointed, considerably longer than the nearly even or slightly rounded tail; first primary longest; tail-feathers acuminate. The Maryland Yellow-throat and Mourning Warbler (subgenus *Geothlypis* of Cabanis) have short rounded wings; the first primary is shorter than second, third and fourth quills; tail long, about equal to wings, and graduated.

†*Orn. of Ill., p. 166.*

1. *Carolina Wren.* 2. *Bay-breasted Warbler.*
3. *Chestnut-sided Warbler,* Males.

and although occurring in nearly all parts of the state either as a native or during migrations it is reported to be quite rare in many of the mountainous districts. Prof. A. Kock has never met with it in Lycoming county and Dr. Van Fleet has observed it in Clinton, Clearfield and Northumberland counties only as a spring and autumnal sojourner. At all times, other than when migrating, these birds are found near water, such as small streams, ponds, etc., in secluded forests and wooded thickets. Feeds on different forms of insect life and occasionally on berries.

Geothlypis agilis (Wils).

Connecticut Warbler.

DESCRIPTION.

Length about 5½; extent about 9 inches; maxilla brownish, lower mandible paler; upper parts olive-green; sides of head slightly grayish or ashy; chin, throat and breast grayish-ashy (in a specimen before me, taken in fall, the chin, throat and breast are more or less edged with rusty), sides very similar to back but paler; rest of under parts including lower tail-coverts yellow; whitish ring around eye.

Habitat.—Eastern North America, breeding north of the United States. "Winter residence unknown."

The Connecticut Warbler seems to have been met with by but few naturalists or collectors in the western or central portions of Pennsylvania. The writer shot one of these birds in September in Erie county, where Mr. Sennett has observed this bird as a migrant, not common. Dr. Van Fleet has found it in Clinton county as a rare migrant, and Prof. Roddy reports it as migratory in Perry and Lancaster counties. The writer has never seen a Connecticut Warbler anywhere in Pennsylvania during the spring migration, but in the fall, usually in September, this species has been found to be quite common in bushy swamps and weedy places in the vicinity of streams and ponds in southeastern parts of the State. It is a quiet and secretive bird and as it frequents, almost constantly, the ground in thick weeds, grasses and bushes it frequently escapes observation. Feeds on beetles, larvæ, spiders, snails and sometimes on small seeds and berries. This bird "breeds in Manitoba* and probably elsewhere in the interior of British America"—(*Ridgway*).

Geothlypis philadelphia (Wils.).

Mourning Warbler.

DESCRIPTION.

"Wings but little longer than the tail, reaching but little beyond its base.

"*Adult male.*—Head and neck all round, with throat forepart of breast, ash-gray, paler beneath. The feathers of the chin, throat and forebreast in reality black, but with narrow ashy margins more or less concealing the black, except on the breast.

* See article in Auk., April, 1884, pages 192-193, by Mr. Ernest E. T. Seton.

Lores and region about the eye dusky, without any trace of a pale ring. Upper parts and sides of body clear olive-green; the under parts bright yellow. Tail-feathers uniform olive; first primary with the outer half of the outer web nearly white.

"*Female* with the gray of the crown glossed with olive; the chin and throat paler centrally, and tinged with fulvous; a dull whitish ring round the eye. Length 5.50; wing 2.45; tail 2.25."—*From Orn. of Ill.*

Habitat.—Eastern North America to the plains, breeding from the higher mountainous portions of Pennsylvania, New England and New York, and northern Michigan, northward. Central America and northern South America in winter.

The Mourning Warbler breeds regularly in a few secluded mountainous districts of Pennsylvania. During migrations is found very generally throughout the state, but in all localities is reported to be rare. Mr. Otto Behr informs me that the Mourning Warbler breeds regularly in the mountainous regions of Sullivan county, and Dr. Van Fleet has observed as a native about Renovo, in Clinton county. Frequents thickets and undergrowth; two specimens obtained by the writer were both shot in brush piles along the edge of a swampy thicket. This warbler arrives here usually from the 15th to the 20th of May. Food of two birds examined by the writer consisted of beetles and spiders.

Goethlypis trichas (Linn.).

Maryland Yellow-throat.

Description (*Plate 42*).

Length of male about 5¼; extent about 7¼; female rather smaller; bill back; legs pale-brown.

Male, in summer.—Above olive-green; forehead and a broad band through the eyes and on side of neck pure black, bordered posteriorly with ashy; chin, throat, breast, under-coverts, and edge of wing bright yellow, fading into a dull buff-white on belly; wings and tail, glossed with yellowish-olive.

Female, in summer.—Colors duller; less yellow on under parts; no black or ashy head markings; top of head, especially forehead, reddish-brown. The young generally resemble the female, but young males may usually be known by indistinct black feathers on sides of head, though feathers of forehead are quite similar to those of female.

Habitat.—Eastern United States, mainly east of the Alleghanies, north to Ontario and Nova Scotia, breeding from Georgia, northward. In winter, south Atlantic and Gulf States and the West Indies.

The Maryland Yellow-throat is an exceedingly abundant summer resident from about May 1st to the latter part of September. During migrations, particularly in the spring, it often visits apple trees to seek, among the leaves and blossoms, for numerous small insects. Frequents, especially, thickets, tangled underbrush, brush-piles and high weeds, generally near streams or swampy places. Its voice is rather loud, yet its song is not unmusical.

This species builds a rather large cup-shaped nest of leaves and dried grasses, usually carefully concealed in a tussock of grass, among weeds, or at the base of low bushes, commonly in low and moist situations.

The eggs, mostly five, are white, finely speckled, usually about the larger end, with black and brown. They measure about .70 by .50 of an inch. The Maryland Yellow-throat feeds on numerous kinds of small insects and larvæ.

GENUS ICTERIA VIEILLOT.

Icteria virens (LINN.).

Yellow-breasted Chat.

DESCRIPTION (*Plate 96*).

Length about 7¼; extent about 10 inches; wings rounded and shorter than tail, which measures about 3¼ inches in length; bill rather long (measuring along gape about three-quarters of an inch), stout, higher than broad at base; ridge of upper mandible and commissure much curved. Birds of this genus are the largest of the family. Upper parts olive-green; chin, throat, chest, breast and inside of wings bright gamboge-yellow; lower part of belly and under tail-coverts white; eye-lids, line under lower jaw and a stripe above the black lores, white. Bill black; feet lead color.

Habitat.—Eastern United States to the plains, north to Ontario and southern New England, south, in winter, to eastern Mexico and Guatemala.

The Yellow-breasted Chat arrives in Pennsylvania about the first week in May, and remains until about the 20th of September. Although this bird is an abundant summer resident in briery thickets and tangled undergrowth, in open woods or along the edges of woods, it is much oftener heard than seen. When migrating this bird skulks silently about bushes and thickets, but when he locates for the summer he becomes one of the most noisy inhabitants of the place. Often when perched in a tree top near his favorite retreats his song is not unpleasant, but if his domain is invaded by a human being he flies into the bushes and greets the intruder with a most varied medley of whistling, cackling, whispering, uncouth guttural sounds, yet all the time remains hidden, and as he continually shifts his position it is often exceedingly difficult to detect him, even though he continues his varied sounds. By remaining perfectly quiet you generally can catch a glimpse of his bright eye and yellow breast, or see his white crissum as he turns in the tangled leafy shrubbery. The nest, composed of leaves, grapevine bark and grasses, is built usually in briery thickets. The eggs, four or five in number, are white, marked with reddish-brown. They measure a little less than one inch in length and a trifle over three-quarters wide. The Chat feeds chiefly on different forms of insect life. He also subsists on wild strawberries, blackberries, raspberries, whortleberries and small wild grapes.

Genus **SYLVANIA*** Nuttall.

Sylvania mitrata (Gmel.).

Hooded Warbler.

Description (*Plate 98, male*).

Length about 5¼; extent about 8½; bill (dried skins) dark brownish-black.

Male.—Forehead back to middle of eye, a streak above and behind eye and a large patch from base of lower mandible extending back over ears, bright yellow; top of head, chin, large throat patch enclosing yellow auricular patch, continuous, with that of head, all deep black; rest of under parts yellow; inner webs of three outer parts of tail-feathers white.

Female similar to male, but black much less distinct, sometimes entirely absent.

Habitat.—Eastern United States, west to the plains, north and east to Michigan, southern New York, and southern New England. In winter, West Indies, eastern Mexico and Central America.

Summer resident from early in May until about middle of September; tolerably common in some localities and rare in other sections. A nest with young of the Hooded Warbler was found some few years ago in Chester county, where this species is usually observed as a rare migrant. The late Prof. S. F. Baird noted this handsome and active bird as a regular summer resident in the higlands of Cumberland county. Reports received from the following-named gentlemen show that the species breeds regularly in a number of localities in our state. Lycoming county (*A. Kock*); Lancaster county, breeds occasionally (*Dr. A. C. Treichler*); Clinton, Clearfield and Northumberland counties (*Dr. Van Fleet*); Erie county (*George B. Sennett*); Perry and Centre counties (*H. J. Roddy*). I have shot specimens of this species during the summer months in the counties of Elk, Cameron, Somerset, Susquehanna, Wayne, Schuylkill, Blair and Cambria, where doubtless these birds annually rear their young. Frequents usually secluded places in high damp woods, or thickets in close proximity to streams. Food consists chiefly of beetles, larvæ, aphides and spiders and occasionally, I think, it feeds on berries. I believe berries are sometimes eaten, because I have taken two specimens in the late summer which were more or less stained about the head with what appeared to be berry-juice.

Sylvania pusilla (Wils.).

Wilson's Warbler.

Description.

Length about 4½; extent about 6¾; top of head black; forehead line over eye and entire under parts bright yellow; sides of body and sides of head same color as back,

* Bill broad and depressed; distinctly notched near end; culmen and commissure about straight to near the tip of maxilla which is slightly curved; rictal bristles long and conspicuous; wings longer than nearly even or slightly rounded tail; wings unmarked; eyes brown; legs (dried skins) pale brownish-yellow.

Wild Turkey.

Male.

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but much paler; upper parts except as previously mentioned olive-green; wings and tail brownish and without any white. Female and young similar but duller; the black-cap in some fall specimens is entirely wanting. Maxilla (dried skin) brownish-black; mandible pale yellowish.

Habitat.—Eastern North America, west to and including the Rocky mountains, north to Hudson's Bay territory and Alaska. Breeds chiefly north of the United States, migrating south to eastern Mexico and Central America.

Wilson's Warbler or Wilson's Black-cap as it is generally called, occurs in Pennsylvania as a regular, but not common, spring and fall migrant. Arrives here usually about the middle of May and returns again in September. Frequents undergrowth in woods and thickets. Feeds on spiders, larvæ, flies, aphides, etc.

Sylvania canadensis (Linn.).

Canadian Warbler.

Description.

Length about 5¾; extent about 8¼; maxilla brownish-black; mandible and legs pale flesh color; no white on wings or tail; top of head black, quite uniform on forehead, but rest of black feathers of crown are extensively edged with the bluish ash of rest of upper parts; ring around eye, and a streak from nostrils to eye yellow; chin, upper part of throat, lower part of breast and abdomen immaculate yellow; the black lores unite with a black patch under eyes, which is continuous with black on sides of neck, and thence extending across the forebreast in a showy series of black spots. Female and young similar but duller, the black markings in former are much duller and are absent on forehead; the young males in the fall sometimes have little or no black on breast.

Habitat.—Eastern North America, westward to the plains, and north to Newfoundland, southern Labrador, and Lake Winnipeg, south, in winter, to Central America and northern South America.

The Canadian Warbler occurs throughout Pennsylvania as a common migrant in the spring and fall; arrives about the 10th of May and when migrating southward is again seen in September. This beautiful bird so conspicuous in his suit of ashy-blue and yellow with black head dress and a showy black necklace, breeds sparingly in some of our secluded mountainous regions, viz: Lycoming county (*Kock*), Cumberland county (*Baird*), Clinton county (*Van Fleet*), McKean county (*J. A. Teulon*), Centre county (*Roddy*). The Canadian Warbler sometimes visits orchards, trees and shrubbery about houses, but usually he frequents forests and is seen commonly on the lower branches of trees or in bushes, actively engaged in catching spiders, flies, small beetles and other kinds of insects.

Genus **SETOPHAGA** Swainson.

Setophaga ruticilla (Linn.).

American Redstart.

Description (*Plate 43*).

Length about 5¼; extent about 8 inches; bill and legs black.

Male.—Prevailing color glossy black; the belly and under tail-coverts white; sides of breast, large space at base of quills and basal half of tail-feathers, except middle pair which are black on inner webs, and axillaries orange red; sides and belly often tinged with orange-red; terminal third of tail and wings, except as described previously, blackish.

"*Female* with the black replaced by grayish-olive above, by brownish-white beneath; the head tinged with ash; a grayish-white lore and ring round the eye; the red of the male replaced by yellow." Young male similar to adult female but browner above, the yellow more of a reddish hue; immature males are often seen with glossy black feathers singly or in patches. Two or three years are, it is said, required before this bird gains its perfect plumage.

Habitat.—North America, north to Fort Simpson, west regularly to the Great Basin, casually to the Pacific coast, breeding from the middle portion of the United States northward. In winter, the West Indies, and from southern Mexico through Central America to northern South America.

The Redstart during migrations—May and September—is abundant and very generally distributed throughout the state. Although found in all sections of our commonwealth as a summer resident, as such it is much more numerous in the northern parts and mountainous regions than elsewhere. In the counties of Erie, Crawford, Lycoming, Blair, Centre, Sullivan, Potter, McKean, and in fact in nearly all the higher mountainous regions, it is a rather common breeder, but in Chester, Delaware, Bucks and Lancaster counties it is seldom found breeding. Frequents chiefly forests, but often, in company with other warblers, visits fruit and shade trees about houses, lawns and parks. The male, in his showy dress of black, fiery orange and white, is one of the most attractive inhabitants of the woods. Like a flycatcher, he darts from his perch with clicking bill to secure flying insects. In addition to their sharp and rapid song, these birds when hopping about the trees, frequently spread their tails; this peculiar habit of opening and closing the tail will often aid you in recognizing a Redstart, in the tops of high trees, when it otherwise might be unknown. The nest, a compact, cup-shaped structure, composed of various vegetable fibers, spiders' webs, and horse hair, is built in the fork or on the horizontal limb of a small tree, six to twenty-five feet from the ground. The eggs, mostly four, are grayish-white or light greenish-white, thinly speckled or blotched with brown and purplish. They measure about .63 long by .50 wide. The Redstart feeds exclusively on an insect diet, consisting chiefly of flies, spiders, plant-lice, butterflies, beetles and different larvæ.

Family **MOTACILLIDÆ**. Wagtails.

Genus **ANTHUS** Bechstein.

Anthus pensilvanicus (Lath.).

American Pipit; Brown Lark; Titlark.

Description.

Bill slender and acute, slightly notched at end; few short bristles about gape; nostrils naked; hind claw very long, slender, curved and sharp pointed; wings long and pointed, the point being formed by first four primaries; some tertial feathers are only a little shorter than longest primaries; base of lower mandible (dried skins) pale brownish yellow; rest of bill, also legs and feet dark brown; eyes brown, above grayish brown with a more or less tinge of olive-green; some feathers of back and pileum have dusky centers; central pair of tail-feathers shorter than the other rectrices, and quite similar but somewhat darker than back; outer pair of tail-feathers mostly white, and next pair of lateral tail-feathers have white spot at end; rest of tail blackish; ring round eye, and a streak about it, pale yellowish-white; chin and throat whitish; under tail-coverts, middle of abdomen and lower part of breast brownish-yellow; jugulum, sides of breast and body pale brownish-yellow streaked with dusky. Length about 6½; extent about 11 inches.

Habitat.—North America at large, breeding in the higher parts of the Rocky mountains and subarctic districts, and wintering in the Gulf States, Mexico and Central America.

The Titlark is a common spring and fall migrant, arriving here usually about the first week in October, and remaining generally until about the middle of November; occasionally small parties of these, shy querulous-voiced birds are seen as winter residents in our southern counties. When migrating northward this species again makes its appearance about the middle of April, and oftentimes a few scattered individuals are found about plowed grounds or along pools and other wet places in fields, meadows, etc., as late as the middle of May. Titlarks, during their stay with us, are usually seen in flocks of from ten to twenty or forty each, but at times larger flocks (one hundred or two hundred each) may be observed. These birds sometimes alight on fences or on the dead limbs of trees, but usually they are seen, when not flying, on the ground, as Mr. Ridgway writes * they move "with a graceful gliding walk, tilting the body and wagging the tail at each step, much in the manner of a *Seiurus*. It is very restless, the flocks seldom remaining long at one place, but soon taking wing, they flit to another spot, or in graceful sweeps pass and repass over a particular place before alighting." In this region I have noticed that the Titlarks are nearly always to be found frequenting plowed fields, where they collect insects, and their larvæ as well as small seeds on which they feed.

* *Ornithology of Illinois*, p. 111.

Family **TROGLODYTIDÆ.** Wrens, Thrashers, Etc.

Subfamily **MIMINÆ.** Thrashers.

THE THRASHERS.

Three species of Thrashers are found in this commonwealth. These birds, as Dr. Coues remarks, "resemble wrens as much as thrushes, habitually residing in shrubbery near the ground, relying for concealment as much upon the nature of their resorts as upon their own activity and vigilance." The common Brown Thrush or Brown Mockingbird, as it is known to many, and the familiar Catbird are abundant summer residents throughout the state. Individuals of both these species sometimes are seen during the early part of winter in our southern counties. The Mockingbird, a southern species, is a rare summer resident in a few localities in the southern parts of Pennsylvania, but as this plainly attired, yet exquisite vocalist, is a common cage-bird he is likewise one of our best known birds. These birds are all noted for the melody of their song, and they also, especially the Mockingbird, possess wonderful powers of mimicry. Birds of this group feed largely on various kinds of destructive insects; they also subsist to a considerable extent on various kinds of small fruits; and the Catbird's taste for grapes, strawberries, etc., is such that he has incurred the enmity of many farmers and fruitgrowers.

Genus **MIMUS** Boie.

Mimus polyglottos (Linn.).

Mockingbird.

Description (*Plate 99*).

Bill distinctly notched and slightly curved at tip of maxilla. Tail much longer than wing. Length about 10½, extent about 14½; female smaller; iris yellowish; bill and legs (dried skins) brownish-black. Above grayish (some specimens have slight brownish tint on middle of back), below whitish, slightly grayish on breast; three outer pairs of tail-feathers more or less white; rest of tail and also wings blackish, but wings have two white bars, and a large patch of same at base of primaries.

Habitat.—United States, south into Mexico. Rare from New Jersey, the Valley of the Ohio, Colorado and California northward.

Irregular and rare summer resident, arrives here about the 1st of May, and departs about the middle of October. A few birds of this species breed regularly in the southeastern parts of Pennsylvania, near the Delaware and Maryland State lines. Some thirty years ago several pairs of Mockingbirds, according to Mr. B. M. Everhart, the well-known botanist and naturalist, annually reared their young near the suburbs of West Chester, Chester county, where, for the past ten or fifteen years, this bird has been observed only as a casual visitant. Solitary Mockingbirds have, at irregular intervals, been taken in the late spring, summer, fall and early winter months in different parts of the state, but some of these birds which I have had the privilege of examining were evidently escaped cage-birds. The Mockingbird builds a bulky nest of small sticks, weeds, pieces of string, cotton, etc., in thick bushes, low

trees, hedge-rows, etc. The eggs, usually five in number, are pale greenish-blue, spotted and blotched with different shades of brown. These birds feed largely on coleopterous insects, larvæ and other insects, and they also eat various kinds of small berries.

GENUS **GALEOSCOPTES** CABANIS.

Galeoscoptes carolinensis (LINN.).

Catbird.

DESCRIPTION (*Plate 72*).

Length about 9; extent about 11½ inches; bill and feet black; iris brown; prevailing color dark slate, somewhat lighter beneath; top of head and tail black; under tail-coverts chestnut. The adult female is rather smaller than the male, and the young are duller in color, with little or no black on crown; under parts paler; under tail-coverts dull reddish.

Habitat.—Eastern United States and British provinces, west to and including the Rocky mountains; occasional on the Pacific coast. Winters in the Southern States, Cuba and middle America to Panama; accidental in Europe.

This well-known bird is a common summer resident from the last week in April to about November 1. The Catbird frequents all localities, but is probably most numerous in briery thickets and tangled undergrowth near streams and ponds. Its bulky nest, constructed of dead twigs, roots, to which are often added dried leaves or grasses, is built mostly in bushes. The eggs, usually four, are deep greenish-blue and unspotted. They measure a little less than an inch long, and a trifle under three-quarters wide. These birds, like some other members of the family, subsist largely on different kinds of small fruits and berries. In the early summer the Catbird feeds on cherries and strawberries; later in the season, mulberries, blackberries and raspberries. Late in the summer and in the autumn he subsists mainly on berries of the spicewood and poke-plant, and also different varieties of both cultivated and wild grapes. This species, in the spring, especially in May, and also when breeding, feeds to a considerable extent on various "worms," beetles, flies, spiders, etc. The Catbird, so called because its sharp and petulant cry which is not unlike the mewing of a cat, is one of our most gifted and delightful songsters.

GENUS **HARPORHYNCHUS** CABANIS.

Harporhynchus rufus (LINN.).

Brown Thrasher; Brown Thrush.

DESCRIPTION (*Plate 44*).

Length about 11¼ inches; extent about 13 inches; tail 5 or 6 inches; bill black with base of lower mandible yellow; legs pale brown; iris of adult yellow; iris of young

brown; upper parts reddish-brown; greater wing-coverts edged with, and middle lower parts, white; breast, sides and crissum strongly tinged with reddish-brown; breast, sides and flanks conspicuously spotted with dark brown.

Habitat.—Eastern United States, west to Rocky mountains, north to southern Maine, Ontario and Manitoba, south to the Gulf States, including eastern Texas. Accidental in Europe.

Common summer resident from about April 20 to late in September. The Brown Thrush, as this bird is usually called, is found in thickets and shrubbery; he frequently, especially in the morning and evening, repairs to the tops of trees, where, for hours at a time, he sings his varied and beautiful song. Like our common domestic fowls, he frequently may be seen scratching among the dead leaves or dusting himself by the roadside. He sometimes visits fields, where corn is being planted, to pick up the scattered grains of maize, and some farmers assert that he often "pulls up corn" when it first appears above the ground. This species breeds usually in low bushes, in briery thickets, sometimes on the tops of old stumps covered with thick vines; very rarely, with us, do they build on the ground. The nest is a loose and bulky structure composed of small twigs, strips of bark, leaves, rootlets, etc. The eggs, four or five in number, are a light greenish or buffy color, thickly speckled with reddish brown. They are a little more than an inch long, and about three-quarters wide.

Although these birds are generally shy and retiring, they will, if their eggs or young are disturbed, display great bravery in defending them. They will fly violently into a person's face and strike with both bill and claws. When their home is invaded by a black snake, they assail such intruder in a most vigorous manner. I once saw a dog, which had upset a nest containing young thrushes, forced to make a speedy retreat when attacked by the old birds, who flew at his head and struck him in the eyes. The Brown Thrush feeds chiefly on insects, berries and small seeds. The following interesting remarks concerning this species are taken from Audubon's Birds of America, Vol. III: "My friend Bachman who has raised many of these bilds, has favored me with the following particulars respecting them: 'Though good-humored towards the person who feeds them, they are always savage towards all other kinds of birds. I placed three sparrows in the cage of a Thrush one evening, and found them killed, as well as nearly stripped of their feathers, the next morning. So perfectly gentle did this bird become, that when I opened its cage, it would follow me about the yard and garden. The instant it saw me take a spade or a hoe, it would follow at my heels, and, as I turned up the earth, would pick up every insect or worm thus exposed to its view. I kept it for three years, and its affection for me at last cost it its life. It usually slept on the back of a chair in my study, and one night the door being accidentally left open, it was killed by a cat. I once knew of a few of these birds to remain the whole of a mild winter in the State of New York in a wild state.'"

Orchard Oriole.

1, 2. Males: 3. Female.

T. M. Brewer, writing of this Thrush, says: "I found a nest containing three eggs, which I removed, leaving in their place three Robin's eggs, and retired to wait the issue. In a few moments the female approached, gave the contents of the nest a hasty survey, and immediately flew off. She returned in a short time in company with her mate, and both flew to the nest apparently in the greatest rage, took each an egg in their *claws*, and dashed it against the ground at a distance of more than a rod from the nest, the female repeating the same to the other egg. This done, they continued for some time to vent their rage on the broken eggs, tossing them about, and at the same time manifesting their displeasure in every possible way. They afterwards forsook the nest."

SUBFAMILY **TROGLODYTINÆ**. WRENS.

THE WRENS.

Thirteen species, also "six geographical forms" and one "local race" of this subfamily are recorded in the fauna of the United States. Of these twenty species and varieties, but six species are found in Pennsylvania. The House Wren, Bewick's Wren, also the Marsh Wrens are found here only as summer residents. The Carolina Wren is most abundant in the summer; though commonly during mild winters individuals of this species are seen in the southern parts of the state. The Winter Wren breeds sparingly in the more northern and mountainous portions of this commonwealth, and during the winter months is very generally distributed throughout the lower third of the state. Wrens are plainly attired, different shades of brown being the prevailing color. These small, musical, active and quarrelsome birds are usually seen with the tail erect. They hide in thickets, weeds and grasses, holes in trees or rocks, also in boxes, and manifest "a fondness for prying into holes and dark places." Wrens are notorious for their scolding propensity, and in this particular they are not unlike some females of the human race, whose chief object in life it would appear is to always annoy those about them. In writing of these birds, Dr. Coues says: "They are sprightly, fearless and impudent little creatures, apt to show bad temper when they fancy themselves aggrieved by cats or people, or anything else that is big and unpleasant to them." Marsh Wrens, as the name would indicate, inhabit marshes or swampy places along rivers; they reside also in rank vegetation in sloughs and ponds. Long-billed Marsh Wrens often nest together in colonies, and construct globular nests, with small openings in the sides. These nests, suspended in herbage, are usually about a foot or eighteen inches above the water. When erecting these swaying houses, composed of coarse grass blades, dead leaves, lined with feathers or soft vegetable materials, the little builders are careful to fix them firmly to the strong coarse grasses or stems and leaves of plants which grow high above the water. Their eggs, six and sometimes ten in number, are a uniform chocolate-brown color. The Short-billed Marsh Wren is said to build a nest similar to that of the Long-billed species, but its eggs differ from those of all other of our wrens, in being white and unspotted. The other of our native wrens nest in holes of trees, hollow fence rails, or in logs and stumps, in shrubbery, boxes and "various odd nooks and corners" about buildings. Their eggs are white, spotted or blotched with different shades of brown. The eggs of the largest species—Carolina Wren—measure about .75 of an inch long and about .60 wide; those of other wrens are smaller, being about .68 long by .50 wide. The wrens feed entirely on an insect diet.

Genus THRYOTHORUS Vieillot.

Thryothorus ludovicianus (Lath.).

Carolina Wren; Mocking Wren; Great Carolina Wren

Description (*Plate 73*).

Bill about as long as head, slender, almost straight, except at tip which is decurved, and obsoletely notched; wings and tail about equal in length; wings are rounded and tail is nearly even; maxilla (dried skins) brownish; mandible paler; legs pale yellowish-brown; above reddish-brown, brightest on rump; throat and line over eye whitish; rest of lower parts, yellowish-brown (decidedly rusty in some individuals and paler in others) becoming darkest on flanks and tibiæ; lower tail-coverts whitish and rusty with transverse dusky bars; middle and greater wing-coverts usually have small white spots. The brownish wings, tail (above) and upper tail-coverts more or less distinctly barred transversely with dusky.

Length about 6 inches; extent about 7½; eyes brownish.

Habitat.—Eastern United States (rare toward the northern border), west to the plains. Rare in southern New England.

The Carolina, the largest of all our wrens, is a resident, and, although reported as occurring in nearly all parts of the state except in the higher mountainous regions, the species is much more plentiful in the lower half of the state than in the northern half. In some parts of the southeast and southwestern sections of Pennsylvania this shy, secretive and gifted songster is quite abundant. The Mocking Wren, as many term this bird, inhabits almost every locality, but he prefers to dwell in woodland, ravines and bushy places in the vicinity of water. He spends much of his time about brush piles, old logs and in the dead tops of fallen trees in woods. Like the Brown Thrush, or Indigo-bird, he often perches in the topmost branch of a tree or bush, and pours forth his loud, varied and melodious song. When feeding these birds like a creeper, may occasionally be observed circling about trunks of trees collecting beetles, larvæ and spiders, from the crevices of the rough bark. Often, in winter, this species, like the little Winter Wren, comes about houses and can be seen hiding in wood-piles or prying into holes and other dark places about buildings. The rather bulky nest, of leaves, grasses, feathers, moss, etc., is sometimes in the interior of sheds or other outbuildings, but usually it constructs its nest in holes in stumps or logs, in secluded situations. I once found a nest with young in a hole among roots of a tree in the side of a bank along a creek, the nest was situated about three feet above the water. The eggs are usually six or seven in number. I have seen this bird picking at grapes in the late fall and winter, possibly he sometimes eats small fruits.

Thryothorus bewickii (Aud.).

Bewick's Wren.

Description.

"Above dark rufous-brown; rump and middle tail-feathers sometimes a little paler, and very slightly tinged with gray and together with the exposed surface of secondaries distinctly barred with dusky. Beneath soiled plumbeous-whitish; flanks brown. Crissum banded; ground color of quills and tail-feathers brownish-black. Length 5.50; wing 2.25; tail 2.50. Length from nostril .39; along gape .70." (*Hist. N. Am. B.*)

Habitat.—Eastern United States, to Eastern Texas and the eastern border of the Plains; north to New Jersey and Minnesota.

Rare summer resident in the eastern and central portions of Pennsylvania, and not reported as occurring in any of the northern counties, but in some of the southwestern counties, beyond the mountains, it is said to be tolerably frequent. From personal observation I am unable to give any information concerning this species, relative to which the following interesting remarks are borrowed from Robert Ridgway's Ornithology of Illinois: "No bird more deserves the protection of man than Bewick's Wren. He does not need man's encouragement, for he comes of his own accord and installs himself as a member of the community wherever it suits his taste. He is found about the cow-shed and barn along with the Pewee and Barn Swallow; he investigates the pig-sty; then explores the garden fence, and finally mounts to the roof and pours forth one of the sweetest songs that ever was heard. Not a voluble gabble, like the House Wren's merry roundelay, but a fine, clear, bold song, uttered as the singer sits with head thrown back and long tail pendent,—a song which may be heard a quarter of a mile or more, and in comparison with which the faint chant of the Song Sparrow sinks into insignificance. The ordinary note is a soft low *plit*, uttered as the bird hops about, its long tail carried erect or even leaning forward, and jerked to one side at short intervals. In its movements it is altogether more deliberate than either *T. ludovicianus* or *T. aedon*, but nothing can excel it in quickness when it is pursued.

"The nest of Bewick's Wren is placed in all sorts of odd places. Usually it is in a mortise-hole of a beam or joist, or some well-concealed corner. One was beneath the board covering of an ash-hopper; another in a joint of stove pipe which lay horizontally across two joists in the garret of a smoke-house; a third was behind the weather-boarding of an ice-house, while a fourth was in the bottom of the conical portion of a quail-net that had been hung up against the inner side of a buggy-shed. None of these nests would have been found had not the bird been seen to enter. The nest is generally very bulky, though its size is regulated by that of the cavity in which it is placed. Its materials consist of sticks, straw, coarse feathers, fine chips, etc., matted together with

spiders' webs and lined with tow and soft feathers of barnyard fowls. The eggs are usually seven to nine in number, but occasionally more, and are white, rather sparsely speckled round the larger end with brown."

GENUS **TROGLODYTES** VIEILLOT.

Troglodytes aëdon VIEILL.

House Wren.

DESCRIPTION (*Plate 45*).

Length about 4¾ inches; extent about 6¾; bill, legs and eyes brown, above brown, rusty on rump and tail; lower parts dull brownish-white or grayish-white; more or less waved or barred with darker shades; back very obscurely or not at all barred.

Habitat.—Eastern United States and southern Canada, west to Indiana and Louisiana.

Common summer resident. Arrives here usually about April 20, and remains until about the 1st of October. In Washington county Messrs. Compton, Warrick and Nease record this species as a rare summer resident. The common representative of this group in Washington county is the Carolina Wren, which is found there during all months of the year. During the summer is found mostly about orchards and in shrubbery near buildings. When migrating these birds are often seen in woods, but they seldom breed there. The nest of twigs, wool, strings, feathers, hair, grasses, etc., is built in various odd places; holes in trees, boxes and hollow fence rails are the most usual building sites. They will build also in an old hat, the sleeves of an old coat or back of loose weather boards on buildings. In the summer of 1888, Mr. Geo. B. Sennett and the writer found a nest, with four young, built in a cavity in a sand bank along the roadside. The eggs, six to nine, mostly seven, measure about .65 long by .50 wide. They are pinkish or creamy-white, speckled with reddish-brown; the brown markings are generally darker colored about the larger end, though the lighter ground color is often almost entirely hidden by the brown coloration. With us at least two broods are raised in a season. The House Wren feeds on beetles, spiders, flies, "moth-flies," grasshoppers and larvæ.

Troglodytes hiemalis VIEILL

Winter Wren.

DESCRIPTION (*Plate 72*).

Length about 4; extent about 6 inches; upper bill, end of lower, tarsi and eyes brown, rest of lower bill and toes yellowish-brown. Above reddish-brown, darkest on head, brightest on rump and tail. Everywhere except on head and upper part of back with transverse bars of dusky and lighter; lower parts pale reddish-brown; belly, flanks and crissum strongly barred with blackish and whitish; the outer

1. Hairy Woodpecker, Male. *2, 3. Downy Woodpecker,* Male and Female.
4. Red-bellied Woodpecker, Male.

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webs of several primaries barred with white and dusky; an obscure line over eye, and streaks or spots on sides of head and neck whitish.

Habitat.—Eastern North America generally, breeding from the northern parts of the United States northward, and wintering from about its southern breeding limit southward.

Common winter resident in southern parts of Pennsylvania from early in October to about the middle of April. Breeds regularly though somewhat sparingly in the northern and mountainous portions of the state. During its residence with us frequents chiefly overhanging banks of streams, the projecting or upturned roots of trees, brush piles and dead logs in woods or thickets near watery places. The sharp *chirr* of this sly and secretive little creature may often be heard—though the bird is hidden from view—in wood-piles about houses, where it comes to seek insects and larvæ, on which it feeds exclusively. I have never seen the nest or eggs of the Winter Wren. The nest is said to be built generally in "thick coniferous woods," in a hole or crevice of a stump or log, close to the ground, and constructed of moss, twigs, lichens, lined with feathers or hair. "Eggs, five to eight, .65 by .48, pure white, minutely dotted with reddish-brown and purplish" (*Coues*).

Mr. Otto Behr says (letter February, 1890) of this species in Sullivan county: "The Winter Wren is quite common with us in summer, but I have never seen him in the middle of winter. It is a very retiring bird, never coming out in open ground in summer. He is invariably found in some dark wood at the edge of a swamp. He is a splendid singer, with a voice entirely out of proportion to his size, and can be heard a long way off, but is rather difficult to approach. We found his nest but once. It was built on the side of a mossy log that laid across a small run in a dark rocky place. The nest was composed entirely of moss with the entrance at one side near the bottom; it contained six eggs which resembled those of the common Chickadee. The eggs were fresh; time July 4."

Genus CISTOTHORUS Cabanis.

Cistothorus stellaris (Licht.).

Short-billed Marsh Wren.

Description.

Bill short, about half the length of head; wings and tail about equal. Above dark brown; back part of crown, middle of back and rump quite blackish and conspicuously streaked with white; throat and central portion of abdomen whitish; wings and tail barred with blackish and brown; sides of body, sides of breast and under tail-coverts reddish-brown; maxilla blackish; mandible paler, legs, feet and eyes brown. Length about 4¾ inches; extent about 6½.

Habitat.—Eastern United States and southern British provinces, west to the plains. Winters in the Gulf States and southward.

Regular but apparently rare summer resident. Inhabits sloughs and

extensive swampy places. This species is quite shy and owing to the fact that these birds frequent the thick grasses, rushes and rank weeds in, often almost impenetrable swamps, they frequently escape notice. I am inclined to think the Short-billed Marsh Wren is more plentiful and generally distributed, in suitable localities, throughout the state than it is usually supposed to be by naturalists and collectors. Concerning this species Dr. John W. Detwiller, of Bethlehem, writes me as follows: "Mr. John Mack brought me a nest, which he found below Quakertown, Bucks county, while hunting Woodcock. The nest was newly constructed, but contained neither eggs or young. Later I found a nest with fresh eggs, in the month of July, on Chain Dam island, Lehigh river." I have observed this wren as a summer resident in Chester and Delaware counties; it breeds regularly, according to Dr. A. C. Treichler, in Lancaster; Mr. Sennett has never observed it in Erie county, but Mr. H. C. Kirkpatrick, of Meadville, informs me it is a summer resident in the low swamps and marshes in Crawford county. It is not reported as occurring in any of our mountainous districts. This species arrives here about the last week in April, and remains until about the 1st of October. Food of seven of these wrens examined by the writer consisted of beetles and spiders.

Cistothorus palustris (Wils.).

Long-billed Marsh Wren.

DESCRIPTION.

Bill about as long as head; maxilla blackish; mandible blackish toward end, but paler at base; legs pale brown (in dried specimens dark brown); eyes dark brown; length 5⅛ or a little over; extent nearly 7 inches. Above dull brown, a little brighter on rump; crown and space on back nearly black; pileum is divided by a faint brownish median stripe; interscapular region and sides of neck streaked (short) with white; tail blackish and barred transversely; a white streak over and extending back of eye; lower parts whitish, sides, flanks and under tail-coverts more or less light reddish-brown; under tail-coverts, faintly barred.

Habitat.—Southern British America and the United States, south, in winter, to Guatemala.

The Long-billed Marsh Wren, an inhabitant of low marshy grounds grown up with sedges and high grasses, is a common summer resident, in suitable localities, throughout the state. It arrives in Pennsylvania about the same time as the Short-billed Marsh Wren, and remains usually a little longer than its short-billed relative, before leaving for its winter home. I have captured individuals in southern Pennsylvania as late as the middle of October. The song of this species, Mr. Ridgway* says, "resembles somewhat that of the House Wren, but is much less agreeable, having a peculiar sputtering or scolding character." The following paragraphs relating to this vivacious and secretive little den-

*Ornithology of Illinois, p. 100.

Yellow-bellied Sapsucker.

1, 2. Male and Female; 3. Young.

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izen of swamps, published in the February number (1887) of the Ornithologist and Oölogist, have been kindly given to me by Mr. Jackson for publication in this report:

"During the latter part of May, 1886, while exploring an extensive swamp within a few miles of West Chester (Chester county), my attention was attracted by a strange, unfamiliar bird note coming from a clump of calamus that grew in about two feet of water. Pausing a moment to listen for the song again, the bird flew from its hiding place to a tree near by, uttering at the same time its harsh, rattling song. In it I recognized the Long-billed Marsh Wren. * * * * A further search revealed a number of finished, though unoccupied nests, located in clusters in various parts of the swamp. At this time there were probably eight or ten nests in different stages of composition, but none of them contained eggs. About three weeks later, on the 12th of June, in company with a friend, I again visited the locality. The birds were still there; one of them, probably the male, singing constantly, and flying restlessly from one spot to another. After searching the whole ground over, and examining twenty or more nests, we at last came upon the right one in a bunch of tall calamus, containing six eggs. Five of these were well advanced; the sixth perfectly fresh. It is possible that there might have been two or more pairs of these birds in the swamp, as it seems almost incredible that a single pair of them could construct so many nests; but I could not find any more birds. This set of eggs was a typical one of the Long-billed Marsh Wren, though probably somewhat darker than the average. The nest was composed mainly of coarse blades of grass (tussock) woven in with the leaves of the calamus, and lined with pieces of dead leaves, a few feathers and other soft material. It hung about eighteen inches above the water, and was by no means a conspicuous object"—*Thos. H. Jackson, West Chester, Pa.* The Long-billed Marsh Wren feeds on different kinds of aquatic insects, particularly beetles and spiders.

Family **CERTHIIDÆ**. Creepers.

Genus **CERTHIA** Linnæus.

Certhia familiaris americana (Bonap.).

Brown Creeper.

Description (*Plate 92*).

Tail-feathers long, rigid and acute quite like a woodpecker's; bill slender, acute, compressed and decurved, unnotched and without bristles; hind toe and claw largest and longest; inner toe longer than outer, three toes in front, one behind. Length about 5½; extent about 8 or little less; maxilla brownish-black; mandible, except tip which is blackish, yellowish flesh color; legs and feet pale brown; eyes brown. Above brownish and blackish, each feather with white central streak; rump

bright rusty; white line over eye; below white; feathers about vent and under tail-coverts, in most specimens, are soiled, more or less, with pale reddish-brown; large wing-quills, except outer two or three primaries, transversely barred with pale reddish-white.

Habitat.—North America in general, breeding from the northern and more elevated parts of the United States northward, migrating southward in winter.

The Brown Creeper is a rather abundant spring and fall migrant throughout the state. In winter it is also frequently met with, but is never as common during the winter months as when migrating in April and October. This unsuspicious and brown-coated creeper frequents chiefly forests; he also sometimes is seen in trees in lawns, parks and gardens. Like a woodpecker, this bird creeps up and around the trunks of trees; and so similar is the coloration of his upper parts, to the rough bark over which he nimbly moves, that he frequently escapes notice. Although unsuspicious, often permitting you to approach within a few feet of the tree-trunk on which he so industriously is seeking his insect food, he usually, when closely approached, quietly and quickly slips round to the opposite side of the tree from the observer. I have never observed this species in Pennsylvania in summer, but that it breeds sparingly in our mountainous regions there is ample proof.

Prof. August Kock mentions it as a regular but rather rare breeder in the mountainous districts of Lycoming county, in the neighborhood of Williamsport. Mr. George B. Sennett informs me that this bird breeds occasionally in the elevated parts of Erie county, where it also is sometimes seen during mild winters. Prof. H. Justin Roddy has found these birds during the summer months in the mountains of Perry and Centre counties. In the forests of Sullivan county, at an altitude of about 2,000 feet, the Brown Creeper is reported, by Mr. Otto Behr, to be a regular, though not common, summer resident. "They breed in hollow trees, in the deserted holes of the woodpeckers, and in the decayed stumps and branches of trees. Their nest is a loose aggregation of soft, warm materials, not interwoven, but simply collected with regard to no other requisite than warmth. * * * Their eggs are small in proportion to the size of the bird, are nearly oval in shape, with a grayish-white ground, sparingly sprinkled with small, fine, red and reddish-brown spots. They measure .55 by .43 of an inch." *(Hist. N. Am. B.).* Food consists entirely of insects, especially small beetles, larvæ, ants, flies, etc.

Family **PARIDÆ**. Nuthatches and Tits.

Subfamily **SITTINÆ**. Nuthatches.

THE NUTHATCHES.

Nuthatches are so named from their habit of placing nuts, seeds, etc., in crevices in limbs or in cracks in bark and hammering away with the hard, sharp-pointed and awl-like bill until the shell is broken and its nutritious and softer contents exposed.

In the fall and winter these birds feed to a considerable extent on nuts, especially chestnuts, acorns and beech nuts, as well as the seeds of many kinds of weeds; their main food, however, consists of different species of tree-inhabiting beetles, larvæ, insect eggs, ants, spiders, etc., which they secure when climbing about the limbs and trunks of trees. The White-breasted—the most abundant of our three species—sometimes feeds on grains of maize which he places in a crevice of a fence rail or in a suitable chink in the rough bark of a tree and with a few strokes of the bill the grain is soon broken into fragments and eaten. Both the White-breasted and Red-breasted Nuthatches are resident in Pennsylvania, but the Brown-headed Nuthatch—a southern bird—if found here, occurs only as a rare and irregular straggler about our southern borders. The white-breasted species, although found generally throughout the commonwealth as a rather common resident, appears to be rather more numerous during winter in the lower half of the state than to the northward. The Red-breasted Nuthatch breeds sparingly in our higher mountain and northern districts and in winter is observed as an irregular visitor in our southern counties. In southeastern Pennsylvania this last-named bird is more frequently met with in October and the early part of November, than at any other period of the year. Birds of this group ascend the limbs and trunks of trees with as much ease and celerity as any of the woodpeckers. In fact this woodpecker-like habit has given rise to the vernacular name of "Sapsucker" by which Nuthatches as well as all the smaller kinds of woodpeckers are commonly known in this region. Woodpeckers, as Dr. Coues states, rarely if ever climb head downward, but Nuthatches frequently are seen descending vertical limbs, etc., head downward. They usually are seen singly, in pairs, or single families, but sometimes small scattered flocks of these noisy, restless and unsuspicious little creepers are observed in woods. In Florida where Brown-headed Nuthatches are very abundant, I have found them during the winter and spring in flocks of considerable size, frequenting the tops of tall trees in open pine woods. These birds, because of the vast numbers of destructive insects they destroy, are highly beneficial, and merit the protection of farmers and fruit-growers, some of whom, unfortunately, from a mistaken idea that they suck the sap of fruit trees, destroy them when they visit the orchards.

Nuthatches build warm nests of feathers, hair, grasses, etc., in holes in trees or stumps, and lay, usually, five or six eggs, which are white and spotted with reddish-brown. Bill about as long as head, awl-shaped, stout, very acute, compressed and unnotched; nostrils concealed by tufts of feathers; wings long and pointed, primaries ten, first very small. The nearly even tail, considerably shorter than the wings, is quite broad and composed of soft rounded (at end and not rigid and acute like a woodpecker's) feathers. Four toes, three in front one behind; claws sharp and curved. Bill and legs are blackish; lower mandible is generally paler at base; eyes brown.

GENUS **SITTA** LINNÆUS.

Sitta carolinensis LATH.

White-breasted Nuthatch; White-bellied Nuthatch.

DESCRIPTION (*Plate 46*).

Length about 6; extent about 11 inches; bill blue-black, base of lower mandible paler; legs and iris brown.

Adult male.—Back and rump ashy-blue; top of head and back of neck glossy black; tail (except two middle feathers, which are same color as back) black, spotted with white; lower parts, sides of head and neck white; flanks and lower tail-coverts rusty brown. Female and young similar though the black on head is indistinct, or sometimes absent.

Habitat.—Southern British provinces and eastern United States to the Rocky mountains.

The White-breasted Nuthatch, generally known in this locality by the name of "Sapsucker," is a common resident throughout the state. During the summer this species inhabits trees in groves and forests, but in winter it visits trees of orchards, yards and gardens in quest of food. The name of "Sapsucker," given to this bird and also to the Downy and Hairy Woodpeckers, is, when so used, a misnomer, as neither the nuthatch or either of the woodpeckers ever feed on sap. Nuthatches, like woodpeckers, creep about the trunks and limbs of trees searching for insects, or their eggs, and various larvæ. The nuthatch deposits its eggs, usually five or six in number, in a warm bed of feathers, hair and grasses which are placed in holes of trees. The eggs are white, speckled with reddish-brown; about .75 long by .55 wide. These birds, in addition to feeding on various forms of insect-life, also eat nuts, acorns, Indian corn, and various seeds, which they frequently stick into the crevices of bark or in cracks of fence rails, and hammer away with their bills until the nut or other food stuff is sufficiently broken that it may be swallowed.

Sitta canadensis Linn.

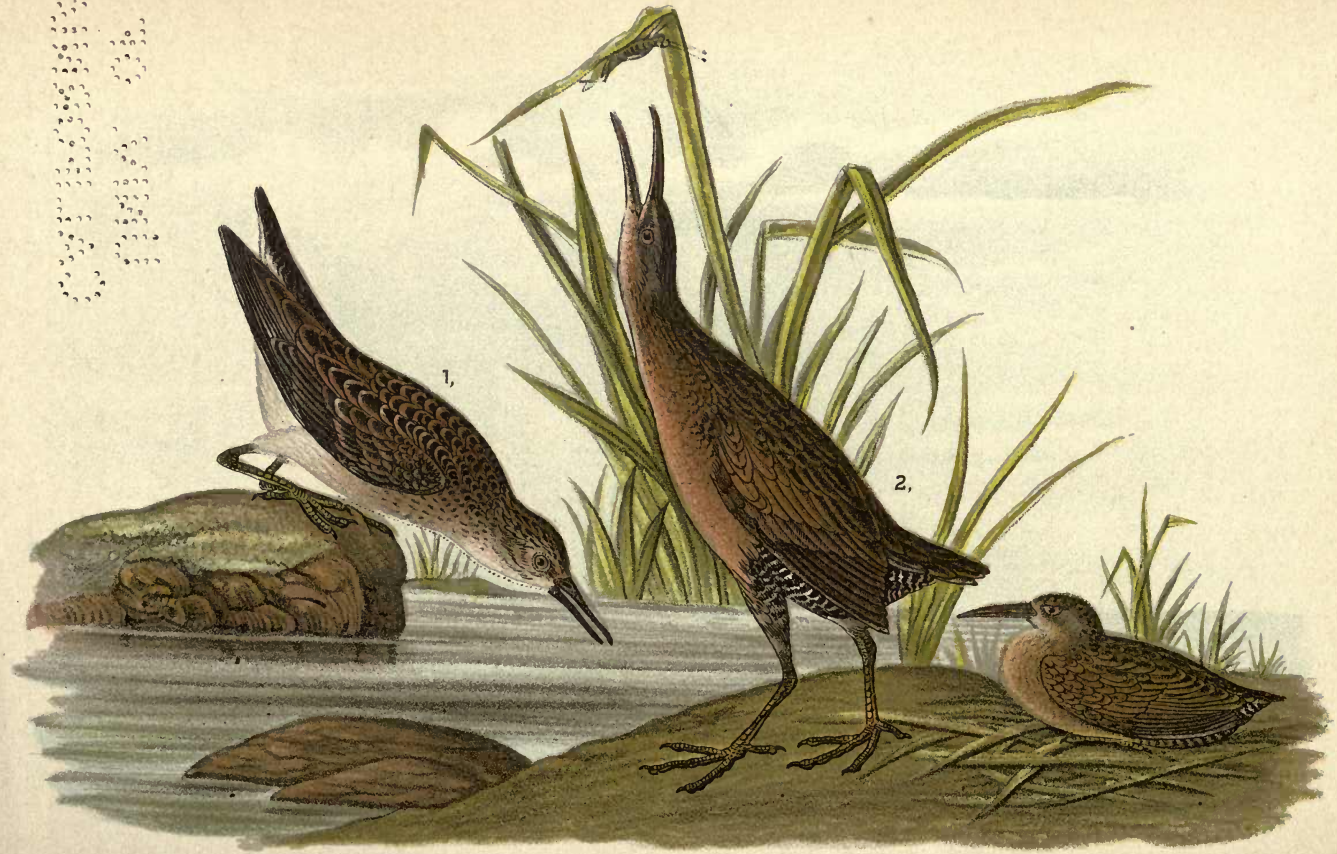
Red-breasted Nuthatch.

Description (*Plate 58*).

Length about 4¾; extent about 8½. Above dark ashy-blue; below reddish-brown (some specimens have feathers about chin and throat whitish), crown and sides of head black (these parts in female are dark grayish); a white superciliary stripe; lores blackish; tail feathers, except central pair, tipped with white.

Habitat.—North America at large, breeding mostly north of the United States, migrating south in winter.

The Red-breasted Nuthatch breeds sparingly in the higher mountainous and northern parts of the state. In the southern parts of the commonwealth it occurs as a rather rare winter visitant. During the spring and fall migrations this species is more frequently met with than at any other time. I have found this nuthatch to be quite plentiful in October and the early part of November in Erie county, and Mr. Sennett informs me it breeds sparingly in portions of Crawford county, where it is found at all seasons of the year. In the southeastern part of our state (Chester, Delaware and Lancaster counties) these birds, according to my observation, are found as rather irregular winter residents; during severe winters they generally go farther southward. Prof. H. J. Roddy has found this bird breeding in the mountainous regions. Food of the Red-breasted Nuthatch is similar to that of the last described species.



1. Least Sandpiper. *2. Virginia Rail.*

Males. Fall Plumage.

Sitta pusilla LATH.

Brown-headed Nuthatch.

DESCRIPTION.

Smallest of all our species.

Bill rather stout; maxilla and terminal third of mandible black, rest of lower mandible yellowish (dried skins). Length about 4 inches or a little more; extent about 8. Top of head and nape brown; lores and streak back of eye similar to pileum but darker; a distinct white spot on hind neck; edge of wing and chin white; under part generally grayish, or pale-brownish white. Tail is less varied with white than either of two last described species.

Habitat.—"South Atlantic and Gulf States, north, regularly, to lower Maryland and Virginia (lower Potomac, shores of Chesapeake Bay, etc.), casually to Ohio, Michigan, Missouri (Pennsylvania?), etc."—*Ridgway.*

The Brown-headed Nuthatch, a southern bird, and one which is much smaller than either of the two previously mentioned species, I have never observed in Pennsylvania, where it is recorded as occurring only as a casual or accidental visitor. Dr. Turnbull (*Birds of East Pennsylvania*) gives it as a rare straggler in summer to the southern counties. The late C. D. Wood, had a specimen in his collection which he stated had been captured near Philadelphia, in the autumn (about 1885).

The stomach contents of twenty-three of these birds (adults and young) captured in Florida, during the winter and spring months, and examined by the writer consisted exclusively of insects, chiefly beetles, larvæ and ants.

SUBFAMILY **PARINÆ**. TITMICE.

THE TITMICE.

About a dozen species and several subspecies of this group are recorded as belonging to the *fauna* of North America; of these three species only are found in Pennsylvania. Two—the Tufted Titmouse and Chickadee are common, but the Carolina Chickadee appears to have been observed, except as a straggler, only in the southeastern part of Pennsylvania (Chester, Delaware, Lancaster and Philadelphia counties). The nests, composed of feathers, hair, cotton, grasses and other soft and warm materials, are built in holes of trees or stumps; the eggs, five to eight in number, are white, spotted or speckled with reddish-brown. Titmice sometimes, like woodpeckers, excavate holes in rotten wood, in which they rear their young, but usually I think these birds endeavor to make use of old holes and commonly only dig new holes when they are unable to find old ones which will be suitable for a nesting place. The writer has examined eleven nests of Titmice, and but two of these were built in what appeared to be new excavations, and both of these were in decaying willow stumps, along a swamp in the edge of a woods. In summer Titmice are usually found in woods and thickets, but in winter these active, vociferous and restless birds frequently come singly or in small flocks about our yards and gardens. The Chickadee or "Tom-tit," by which latter name he is known to many, is much more abundant than either of the other species, and in the autumn and winter he is one of the frequent visitors to orchards and shrubbery about houses. During the late spring, summer and early fall Titmice subsist mainly on an insect diet, consisting principally of different larvæ, small beetles, plant-lice, spiders, ants, etc. In winter they devour various

kinds of insects that can be found, but their main food, at this time, is made up of seeds of different weeds and grasses; they also eat berries, and, like the Nuthatches, they often feed on chestnuts, acorns and cereals. Titmice, like Jays, are carnivorous and sometimes, according, to Nuttall (and other writers), "they carry their depredations so far as to pursue and attack sickly birds, even of their own species, commencing like Jays, by piercing the skull, and devouring the brain"—(*Nuttall*).

Primaries ten, the first very short, being about half as long as second; nostrils hidden by antrorse bristly feathers; wings short and rounded, equal to or shorter than the rather long, soft and almost rounded tail; the bill shorter than the head, is stout, hard, conical and rather blunt at tip, and unnotched. Three toes in front, and one behind; bill blackish; legs lead colored; eyes brown.

GENUS **PARUS** LINNÆUS.

Parus bicolor LINN.

Tufted Titmouse.

DESCRIPTION (*Plate 99*).

Length about 6; extent about 10 inches; bill black, both upper and lower outlines convex; legs lead color; crown with a conspicuous crest; upper parts ashy or leaden-gray; forehead dull sooty-black; lower parts whitish; sides and flanks rusty brown. In the young the crest is shorter, and the black of the forehead, also the rusty brown of the sides very indistinct.

Habitat.—Eastern United States to the plains, but rare towards the northern border, being a straggler merely to southern New England.

Common resident particularly in southeastern Pennsylvania; generally found in forests, yet it often, especially in winter, comes around dwellings. May easily be recognized by its loud whistling notes or its ordinary cry of *dee, dee, dee.* Although this bird usually nests in holes of trees in woods, it occasionally builds in boxes about houses. The nest is composed of feathers, dried grasses, leaves, etc. The eggs, about three-fourths of an inch long and a little more than one-half wide, usually five or six in number, are white, speckled with reddish-brown and lilac. The Tufted Titmouse feeds on various forms of insect life, also seeds of different weeds and grasses, and at times he subsists on small berries. This species is seldom seen in Erie county, and it is also said to be rather rare in other of the northern counties. In many of the mountainous districts it is reported to be rare or found only as a winter visitor.

Parus atricapillus LINN.

Chickadee; Black-cap Titmouse.

DESCRIPTION (*Plate 47*).

Length about 5½ inches; extent about 8 inches; bill black; legs bluish-gray; head not crested. Back brownish ashy; top of head, chin and throat black; sides of head white; beneath whitish; brownish on sides; wing and tail feathers margined with white.

Habitat.—Eastern North America, north of the Potomac and Ohio Valleys.

Common resident; found in all localities, but during the summer these birds are usually seen in woods and thickets, from which in winter they often come about houses, or, in small flocks, frequent weedy places in fields and swamps in search of food. The common name arises from their familiar note of *chick-a-dee-dee.* These birds sometimes nest in natural cavities, but frequently, woodpecker-like, they excavate holes in trees, stumps, etc., in which they build a nest of hair, feathers, mosses, fine dried grasses or other soft materials. The eggs, mostly six or seven, sometimes more, are white, spotted or dotted, chiefly about the larger end, with reddish-brown; measure about .60 long by .50 wide. Audubon writing of the Black-cap says: They lay their eggs in the hole deserted by some small woodpecker. "As it has been my fortune to witness a pair at this work, I will here state what occurred, notwithstanding the opinion of those who informed us that the bill of a titmouse is 'not shaped for digging.' While seated one morning under a crab-apple tree, I saw two Black-cap Titmice fluttering about in great concern, as if anxious to see me depart. By their manners, I was induced to believe that their nest was near, and anxious to observe their proceedings, I removed to a distance of about twenty paces. The birds now became silent, alighted on the apple-tree gradually moved towards the base of one of its large branches, and one of them disappeared in what I then supposed to be the hole of some small woodpecker; but I saw it presently on the edge, with a small chip in its bill, and again cautiously approached the tree. When three or four yards off I distinctly heard the peckings or taps of the industrious worker within, and saw it come to the mouth of the hole and return many times in succession in the course of half an hour, after which I got up and examined the mansion. The hole was about three inches deep, and dug obliquely downward from the aperture, which was just large enough to admit the bird. I had observed both sexes at this labor." The Chickadee feeds on different forms of insect life and the seeds of various weeds, grasses and other plants. Crumbs of bread, pieces of meat, fragments of apples, pears and other fruits are also eaten.

Parus carolinensis AUD.

Carolina Chickadee.

DESCRIPTION.

Length about 4½ inches; extent about 7. Similar to *atricapillus* but averaging smaller: the wing and tail dimensions in *atricapillus* average about the same, but in *carolinensis* the tail is a little *shorter* than the wing. The wings (tertials and greater coverts) lack the distinct white, so well marked in *atricapillus.*

Habitat.—"Eastern United States, chiefly south of 40°, west to Missouri, Indian Territory and eastern Texas.—*Ridgway.*

The Carolina Chickadee, a southern species, has been found as an oc-

casional summer resident in the southern part of Pennsylvania. Dr. Treichler has observed it as a rare breeder in the vicinity of Elizabethtown, Lancaster county. Its nests and eggs have also been obtained in Chester county; in Clinton county Dr. W. Van Fleet records it as a straggler. In relation to the breeding of this species in Chester county, I am indebted to Dr. Wm. D. Hartman, the well known conchologist of West Chester, Penna., for the following: About fifteen years ago Dr. W. L. Hartman, of Pittston, Penn'a, found the Carolina Chickadee breeding in willow trees near a swamp, about three miles from West Chester. The nests, composed entirely of moss (*Sphagnum*), were all built in cavities in the decayed trunks of the willow trees. The first nest taken contained nine eggs, and after these were secured Dr. Hartman twice, in the course of about a month, secured two more nests in the same swamp. Each nest was placed in a new cavity which had nine eggs. When the last set of eggs was secured the old bird was captured and sent to the Smithsonian Institution and identified. Dr. Hartman saw but one pair of birds. The excavations, rather small at the entrance and quite roomy at the bottom, were unquestionably, the doctor believes, made by the birds whose eggs were taken. Food similar to that of the Black-cap Titmouse.

FAMILY **SYLVIIDÆ.** KINGLETS AND GNATCATCHERS.

SUBFAMILY **REGULINÆ.** KINGLETS.

THE KINGLETS.

Two representatives of this subfamily, the smallest of all our species except the Hummingbird, are found in Pennsylvania. These the Ruby-crowned and Golden-crowned Kinglets are common and generally dispersed throughout the state. The Ruby-crowned is abundant during migrations (spring and fall) in woodland, thickets, orchards and it is also often seen in trees and shrubbery about the habitation of man, actively seeking insects. The Golden-crowned equally as plentiful as the other species, with which, during the spring and autumn, it frequently associates is one of our most unsuspicious, dainty and interesting winter residents. Both of these species are usually found in this locality in flocks of from a half dozen to twenty (sometimes many more) each. These birds when migrating are often observed in considerable numbers in evergreens and bushes about streams. Kinglets, as their specific names indicate, have conspicuous color patches on the head. According to my observation these diminutive birds feed exclusively on insects, such as plant-lice, small beetles, flies, spiders and larvæ; some writers, however, assert that they subsist, in part, on small berries and different seeds, which they break open by striking with the bill in the same manner as a Titmouse. The blackish, slender and straight bill, much shorter than head, is notched at tip, depressed at base, and much compressed toward the terminal half. Conspicuous rictal bristles; tail moderately forked and shorter than the wings. First primary about one-third as long as second, which is shorter than third, fourth, fifth or sixth, but about equal to the seventh. Eyes brown. Legs and feet (dried skins) yellowish-brown.

GENUS **REGULUS** CUVIER.

Regulus satrapa LICHT.

Golden-crowned Kinglet.

DESCRIPTION (*Plate 48*).

Length about 4; extent about 6.50; legs brownish-yellow; feet yellowish; bill black. Upper parts olive-green; wings and tail dusky, edged with yellowish; crown (adult male) bordered in front, also on sides, with black, embracing a central patch of fiery orange-red encircled by yellow. The female has no flame-colored patch; crown is entirely yellow, margined with black; wing and tail-feathers edged with yellowish; lower parts dull whitish.

"*Female, first plumage.*—Pileum (including forehead) dark smoky-brown; line over the eye entirely cut off at its anterior corner by the junction of the dusky lores with the brown of the forehead; tertiaries broadly tipped with white; breast strongly washed with pale brown color; otherwise like adult. From a specimen in my collection taken at Upton, Me., August 25, 1874. A young male taken August 25, 1873, is in every way similiar. A good series of specimens of various ages shot during August and the early part of September illustrate well the transitional stages. First the brown of the pileum darkens into two black stripes, while the line over the eye broadens to meet its external margin. Next, two lines of yellow feathers appear inside and parallel with the black ones, while the orange of the central space (of the male) is produced last" (*Brewster, Bull. Nutt. Orn. Club, June, 1878, 19*). *From Orn. of Ill.*

Habitat.—North America generally, breeding in the northern and elevated parts of the United States and northward, migrating south in winter to Guatemala.

Common winter resident from about the middle of October to the middle of April. This species is most numerous in October, November, March and April, or when migrating south and north. The Golden-crowned Kinglet frequents the tops of tall forest trees as well as low bushes, and frequently, particularly when migrating in the spring and fall, is found, in company with the Ruby-crowned Kinglet (*R. calendula*), in apple orchards. Kinglets are generally seen in small flocks. They feed on various forms of insect life; they are very expert in capturing small insects upon the wing, and destroy great numbers of plant-lice, spiders, flies, ants, besides devouring large numbers of insect eggs and larvæ.

Mr. Robert Ridgway (*Ornithology of Illinois, p. 76*) says: "The delicate little Golden-crowned Kinglet—smaller even than the Ruby-crown—is known in Illinois, and, indeed, in all portions of the United States, except the northern coniferous woods and similar forests of the higher mountains, only as a winter visitant or resident. He is most often seen during clear frosty mornings in midwinter, and seems particularly in his element when the trees are decked with an icy covering of sleet—when the woods appear like fairy land, and the pure crisp air instills fresh vigor to those who sally forth to enjoy its exhilarating influence. Then the little gold-crests may be seen in woods or parks in scattered troops, nimbly hunting among the crystal branches, now hanging, in titmouse

fashion, then dropping to another limb, and carelessly hopping about apparently not feeling the contact of the ice with their dainty feet. At such times none of our birds are tamer than these dainty little creatures and none certainly more lovely. They come about the intruder as if utterly unmindful of his presence, often so near that the sparkle of the little black eye, the flash of the glowing orange crown, and every detail of his pretty plumage can be seen." My friend Prof. August Kock, of Williamsport, informs me he has occasionally met with this species and their young in August and September in Lycoming county. Perhaps future investigations will show that this species breeds sparingly in some of the extensive coniferous forests of our higher mountain ridges. I have never seen the Golden-crown in this state before the 20th of September, but have seen two or three specimens of this species which were said to have been taken in Pennsylvania in midsummer.

Regulus calendula (Linn.).

Ruby-crowned Kinglet.

DESCRIPTION.

Length 4¼ to 4½; extent about 6½; above dark olive-green; rump and outer edges of wing and tail-feathers bright olive-green; wing-bars, ring round eye and outer edges of inner tertials white. Below grayish-white, more or less shaded, especially on sides and flanks, with pale yellowish-olive. Large concealed patch of scarlet on crown in male. Female and young lack this bright crown patch.

Habitat.—North America, south to Guatemala, north to the Arctic coast, breeding mostly north of the United States.

The Ruby-crowned Kinglet is an abundant spring and fall migrant, arriving in Pennsylvania early in April and remaining until about the 1st of May. Frequents woods, orchards and thickets. After rearing their young in more northern latitudes these diminutive creatures reappear in this region about the last week in September, and single individuals or small scattered flocks occasionally remain as late as the first week in November. The food of this species is similar to that of the Golden-crown. "This species of *Regulus* appears to lack the small feather which in *satrapa* overlies and conceals the nostrils, which was probably the reason with Cabanis and Blyth for placing it in a different genus. There is no other very apparent difference of form, however, although this furnishes a good character for distinguishing between young specimens of the two species" (*Hist. N. Am. B.*).

American Woodcock.

1, 2. Adults; 3. Young.

SUBFAMILY **POLIOPTILINÆ**. GNATCATCHERS.

GENUS **POLIOPTILA** SCLATER.

Polioptila cærulea (LINN.).

Blue-gray Gnatcatcher.

DESCRIPTION.

Bill long and slender much depressed at base, distinctly notched at end and slightly hooked; bill anterior to the exposed nostrils rapidly narrows, and becomes very slender at tip; the round wings are about equal to tail; tail graduated, feathers with rounded ends. Length about 5 inches; extent about 6¾; bill and legs blackish; eyes dark brown. Above grayish-blue; crown decidedly blue, rump somewhat lighter than back; forehead and line over eye black (absent in female); whitish ring round eye. Lores and under parts pale bluish-white, except chin and median line on throat, and abdomen also in some specimens, pure white. First and second pairs of tail-feathers black at base then white; third and fourth black with white tips, rest black.

Habitat.—Middle and southern portions of the United States, from the Atlantic to the Pacific, south, in winter, to Guatemala, Cuba and the Bahamas; rare north toward the Great Lakes, southern New York and southern New England, straggling north to Massachusetts and Maine.

The Blue-gray Gnatcatcher occurs as a summer resident in the southern parts of Pennsylvania. Arrives here about the last week in April and remains until about the middle of September. I have observed this bird in the southeastern counties as a rare visitor, in the spring, late summer and autumn. In southwestern Pennsylvania the gnatcatcher is reported to be a rather frequent summer resident. Messrs. M. Compton, W. T. Warrick and James S. Nease, all report it as being rather common during migrations in Washington county, and they also mention it as a probable breeder. Dr. T. Z. Hazzard, of Allegheny City, informs me it breeds regularly in his locality (Allegheny county). The Blue-gray Gnatcatcher, Mr. H. J. Roddy says, "is common at one place near Lebo, Perry county. I find them breeding there every year; saw a family August 10, on Jack's mountain." I found this bird to be quite common in February, March and the early part of April in Florida. Its food consists entirely of small-winged insects and various larvæ. "It is an expert insect-catcher, taking its prey on the wing with great celerity. All its movements are very rapid, the bird seeming to be constantly in motion as if ever in quest of insects, moving from one part of the tree to the other, but generally preferring the upper branches" (*Hist. N. Am. Birds*). Never having had the good fortune to find the nest or eggs of this species, I take the following descriptions concerning the same from other writers. "The nest of this species is one of the gems of bird architecture. It is a very compact mass of soft felted materials, elaborately and artistically ornamented on the outside with gray and glaucous lichens, the deep interior cavity lined with softest down and feathers. The shape varies from that of a deep cup

to that of an inverted cone, the opening being always at the top. This elegant structure is securely fastened—either saddled to or woven about—a horizontal limb, usually near the top of a tree, but, especially if the tree be a very tall one, sometimes on one of the lower branches. Often it is attached to a limb of nearly the same diameter as itself, thus appearing as a knot or other excrescence" (*Orn. of Illinois*). "Eggs, four to five, about .60 by .45, whitish, fully speckled with reddish and umber-brown and lilac" (*Coues' Key*).

FAMILY **TURDIDÆ**.* THRUSHES, BLUEBIRDS, ETC.

SUBFAMILY **TURDINÆ**. THRUSHES.

THE THRUSHES.

Eight representatives of this subfamily are recorded as occurring in Pennsylvania. Three—the American Robin, Wood Thrush and Bluebird—are common and very generally distributed throughout the state as summer residents, and in winter the Robin and Bluebird are frequently met with, especially in the southern sections of the commonwealth. With the exception of Bicknell's Thrush, the members of this group, although quite numerous, being found in nearly all parts of the state during migrations, are known chiefly to ornithologists only. Many farmers and fruit-growers regard the Robin (*Merula migratoria*) as a great nuisance and wage war against him because of his love for various small fruits. The other members of this group, like the Robin, feed also to a more or less extent on berries of different kinds. These birds subsist largely on various species of noxious insects; the service which they all render, in this particular, should secure for them the protection of both the agriculturist and horticulturist.

GENUS **TURDUS** LINNÆUS.

Turdus mustelinus GMEL.

Wood Thrush; Wood Robin.

DESCRIPTION (*Plate 100*).

Length about 8; extent about 13 inches; bill blackish, yellowish at base; legs flesh color; iris brown. Upper parts clear cinnamon brown, brightest on top of head, and shading into olive on rump and tail; lower parts pure white, and everywhere, except on chin, throat, middle of belly and under tail-coverts, marked with roundish, dusky spots.

Habitat.—Eastern United States to the plains, north to southern Michigan, Ontario and Massachusetts; south, in winter to Guatemala and Cuba.

Abundant summer resident from about the last week in April, to some seasons, as late as October 20. The Wood Robin, the name by which the Wood Thrush is best known in many localities in Pennsylvania (some term it Hermit Thrush), is a common inhabitant of woods. It especially delights to frequent bushes in woodland, near streams or other

* "Bill slender, usually distinctly notched, and with distinct rictal bristles. Tarsi booted, *i. e.*, the anterior covering undivided for the greater part of its length. Young distinctly spotted" (*Orn. of Ill.*).

watery places. The sweet, ringing, bell-like notes of this bird are such that it justly ranks as one of our most entertaining songsters. It builds a compact and rather large nest of mud, leaves and dried grasses in trees and bushes, usually in low or damp woods. The eggs, commonly four, are light greenish blue, and measure about one inch long by three-fourths wide. The Wood Thrush feeds on numerous forms of insect life, it devours large numbers of beetles, earthworms, crickets, flies, larvæ, etc., and also, like the Common Robin, subsists on various small fruits and berries.

Turdus fuscescens STEPH.

Wilson's Thrush ; Veery ; Tawny Thrush.

DESCRIPTION (*Plate 100*).

Length about 7¾ inches ; extent about 12¼ ; bill brownish ; basal half of mandible paler ; tarsi pale yellowish-brown, feet darker (dried skins). Above uniform reddish brown ; no contrast between tail and back, no light ring about eye ; sides of head grayish ; chin, upper part of throat whitish and generally without spots ; middle of abdominal region and under tail-coverts white ; sides shaded with grayish or pale olive ; lower part of throat and breast buff-colored, and marked with small brownish spots ; tail and wing feathers brownish.

Habitat.—Eastern United States to the plains, north to Manitoba, Ontario, Anticosti, and Newfoundland.

Rather common spring and fall migrant throughout the state ; occasionally, during mild winters, solitary individuals are met with in the southern portions of Pennsylvania. Wilson's Thrush breeds sparingly in the northern and mountainous parts of the commonwealth. It has been found breeding within our limits by Dr. Detwiller, of Northampton county ; Mr. George P. Friant has also observed it, in summer, in Lackawanna county, and it also breeds, occasionally, Mr. Sennett tells me, in Crawford and Erie counties, where it is common during migrations. "Nest, on ground or near it, of leaves, grasses, etc., but no mud ; eggs, four to five, greenish-blue like those of the Wood Robin, normally unspotted, .90 by .60"—(*Coues*). This bird, usually seen singly, but sometimes in small parties, frequents chiefly thick woods and swampy places. Feeds on insects, worms and berries.

Turdus aliciæ BAIRD.

Gray-cheeked Thrush.

DESCRIPTION (*Plate 96*).

A little larger than the Olive-backed Thrush, from which it differs in having no yellowish ring round eye, and sides of head are grayish *not* yellowish. Jugulum more or less shaded with buff.

Habitat.—Eastern North America, west to the plains, Alaska and eastern Siberia, north to the Arctic coast, south, in winter, to Costa Rica ; breeds chiefly north of the United States.

The Gray-cheeked Thrush is a rather plentiful spring and fall migrant in Pennsylvania; frequents woods and thickets. The food is similar to that of the Wilson's Thrush.

NOTE. A race of this species,—Bicknell's Thrush (*Turdus aliciæ bicknelli*) has been described by Mr. Ridgway. A description of this bird as given by Mr. Ridgway (Vol. I, Ornithology of Illinois) is as follows: "Similar to *Turdus aliciæ* Baird, but much smaller and (usually) with the bill more slender. Wing, 3.40–3.80 (3.65); tail, 2.60–2.90 (2.75); culmen, .50–.52 (.51); tarsus, 1.10–1.25 (1.13); middle toe, .65–.70(.68)." A single specimen believed to belong to this newly discovered race, named in honor of its discoverer Mr. Eugene P. Bicknell, who first obtained it on the Catskill Mountains, was captured by Prof. H. J. Roddy, near Chickies' Rock, Lancaster county. I have never seen the specimen taken by Mr. Roddy, who since the above was written writes me as follows concerning it. "*Turdus aliciæ bicknelli*, I am not quite sure of. The more I study my specimen the more I think it is *Turdus aliciæ* somewhat changed in some way and yet not *bicknelli*." The habitat of this bird as given in Ridgway's Ornithology of Illinois is the higher mountains of northeastern United States, from the Catskills and Adirondacks, in New York, to the White mountains of New Hampshire; breeding from an elevation of 4,000 feet upward. Straggler to Illinois (Warsaw, May 24, 1884; Chas. K. Worthen)."

Turdus ustulatus swainsonii (CAB.).

Olive-backed Thrush.

DESCRIPTION (*Plate 100*).

Length about 7¼ inches; extent about 11½; upper parts uniform greenish-olive; conspicuous yellowish ring round eye; lores, sides of head, chin, throat and breast strongly tinged with yellowish; anterior lower parts, except chin and upper part of throat, marked with numerous and large dusky and blackish spots; sides grayish-olive; middle of abdomen and under tail-coverts white; wings and tail dusky; somewhat paler on under surface.

Habitat.—Eastern North America, and westward to the Upper Columbia river and East Humboldt mountains, straggling to the Pacific coast. Breeds mostly north of the United States.

Common spring and fall migrant, generally distributed throughout the state; arrives here usually about the last of April and departs in October. The Olive-backed Thrush breeds occasionally, it is said, in our higher mountainous regions.

Turdus aonalaschkæ pallasii (CAB.).

Hermit Thrush.

DESCRIPTION (*Plate 100*).

Size about the same as last. Upper parts olive; rump and tail reddish-brown; yellowish ring round eye; below white; shaded on sides with grayish-olive; middle of upper part of throat usually immaculate; sides of head, in some specimens, very similar to back; but usually sides of head, sides of neck, lower part of throat and breast are tinged with buff; lower throat and breast conspicuously marked with large blackish and dusky-olive spots; upper surface of tail reddish-brown, below paler; outer webs of wing-quills similar but lighter; inner webs blackish.

Habitat.—Eastern North America, breeding from the northern United States northward, and wintering from the Northern states southward.

Fish Hawk.

NO WILD ANIMALS

This Hermit Thrush is the most abundant of all the thrushes except the American Robin. During the spring and fall migrations this bird is much more abundant than at other times. During mild winters a few of these thrushes are seen in sheltered localities in the southern parts of our state. This species, it is stated, breeds sparingly in some of our higher mountainous districts.

GENUS **MERULA** LEACH.

Merula migratoria (LINN.).

American Robin.

DESCRIPTION (*Plate 49, old and young*).

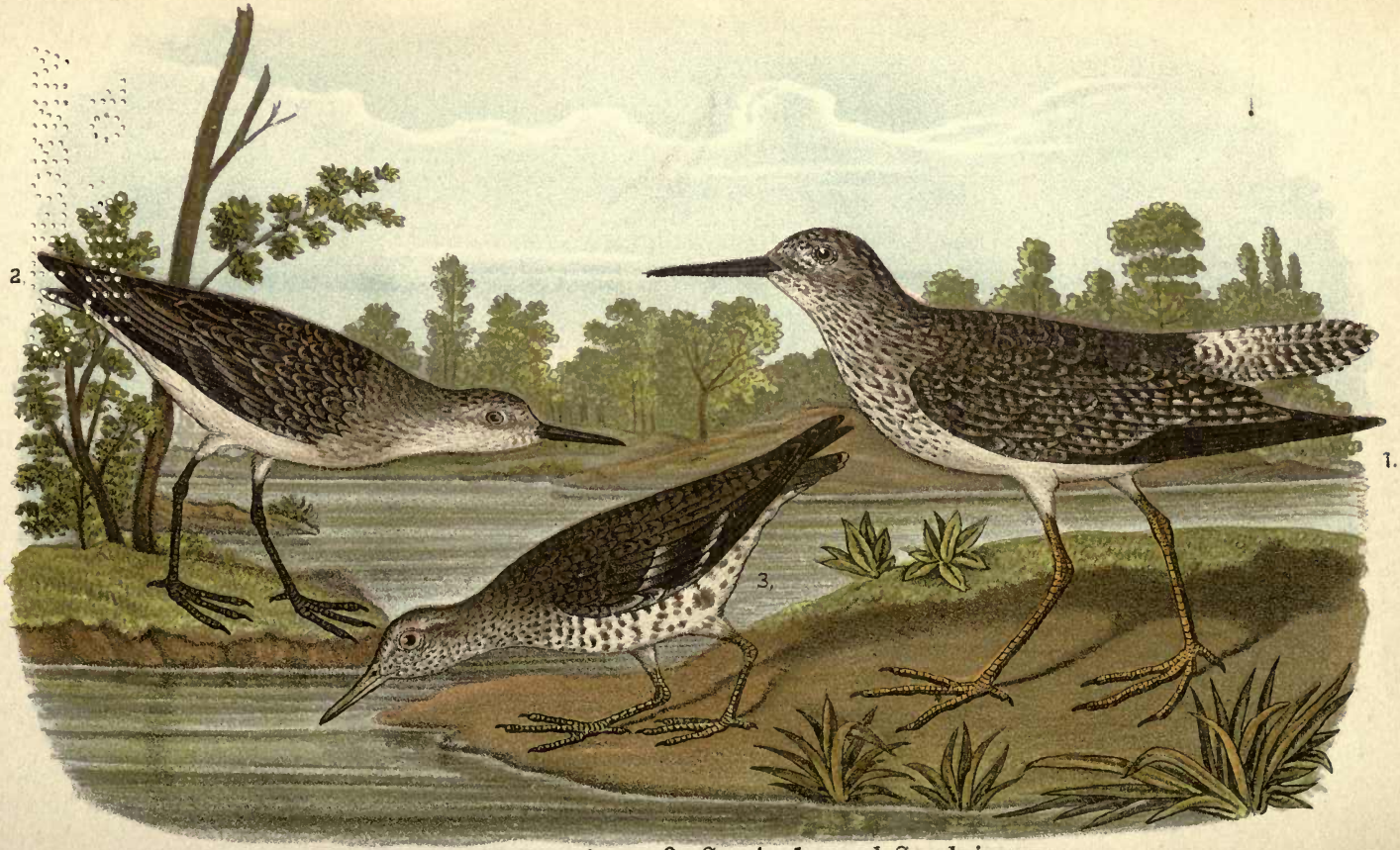
Length about 9½; extent about 16 inches; bill yellow, upper mandible tipped with black; iris brown; legs and feet brownish; above plain grayish, blackish on head, tail and sides of neck; lower parts reddish-brown, paler in female; lower part of belly, anal region and under tail-coverts white; some specimens have under tail-coverts spotted with grayish-brown; outer tail feathers tipped with white; young are spotted above and below.

Habitat.—Eastern North America to Rocky mountains, including eastern Mexico and Alaska. Breeds from near the southern border of the United States northward to the Arctic coast; winters from southern Canada and the Northern states (irregularly) southward.

This familiar bird is abundant throughout the state during the spring, summer and autumn. In the winter months it is not uncommon to find small flocks about cedar thickets, swamps and other well-sheltered localities, especially in the southern parts of the state. At times, other than when breeding, Robins are gregarious. Late in the summer and autumn they collect in good-sized flocks and repair every evening to some favorite roosting resort, where they are found often in company with Cowbirds and Purple Grackles. The Robin seems in no way particular about the site selected for its bulky nest of mud, leaves, dried grasses, etc. Although it usually builds in a tree, it frequently nests under an overhanging bank along the roadside, or under a porch, and occasionally on fence-rails. In May, 1880, a friend of mine found, near West Chester, a nest of this bird built on the ground in the middle of a woods, and concealed by May-apple plants. The eggs, usually four or five in number, are light bluish-green, and measure about 1.16 long by .79 wide. With us at least two broods are raised each season. By farmers and fruit growers the Robin is very generally regarded as a nuisance, because of his fondness for various small fruits. The following notes and remarks on the food, it is hoped, will suffice to show that this species is at least somewhat beneficial to the agriculturist and pomologist, even though it will, at certain periods of the year, subsist largely on a fruit diet: In the early part of June, 1879, twenty-three Robins were captured, on the same date, in East Bradford, Pa. The birds were

taken in an apple orchard, or in the act of going to or from cherry trees located near said orchard. Thirteen birds of this series showed, on dissection, remains of cherries; five of the thirteen had only this fruit in their viscera. The remaining eight birds had, in addition, and certainly with two exceptions, in excess, insect food, consisting mainly of small brown and black-colored beetles. One bird had in its stomach two earthworms. Seven young birds, taken from the nests, with the exception of one that had a small piece of cherry, which, however, was present in connection with a large insect mass, furnished only proof of an insectivorous diet, which was so comminuted as to be almost unrecognizable. Sufficient evidences, however, were present to establish the fact that beetles were an important element in their bill of fare. Two birds destitute of all food materials.

Dr. Coues (*Birds of the Colorado Valley*) writes: "The Robin is a great eater of berries and soft fruits of every description, and these furnish, during the colder portion of the year, its chief sustenance. Some of the cultivated fruits of the orchard and garden are specially attractive, and no doubt the birds demand their tithe. But the damage in this way is trifling at most, and wholly inconsiderable in comparison with the great benefit resulting from the destruction of noxious insects by this bird. The prejudice which some persons entertain against the Robin is unreasonable; the wholesale slaughter of the birds which annually takes place in many localities, is as senseless as it is cruel. Few persons have any adequate idea of the enormous, the literally incalculable, numbers of insects that Robins eat every year. It has been found, by careful and accurate observations, that a young Robin, in the nest, requires a daily supply of animal food equivalent to considerable more than its own weight. When we remember that some millions of pairs of Robins raise five or six young ones once, twice or even three times a year, it will be seen that the resulting destruction of insects is, as I have said, incalculable. I have no doubt that the services of these birds, during the time they are engaged in rearing their young alone, would entitle them to protection were the parents themselves to feed exclusively upon garden fruits for the whole period. But at this time the diet of the old birds is very largely of an animal nature; nor is this the only season during which the destruction of insects goes on. Upon the first arrival of the main body of the birds, early in the spring, long before any fruits are ripe, they throw themselves into newly-plowed fields, and scatter over meadows, lawns and parks, in eager search for the worms and grubs that, later in the season, would prove invincible to the agriculturist were not their ravages thus stayed in advance by the friendly army of Robins."



1. Greater Yellow-legs. 2. Semipalmated Sandpiper.
3. Spotted Sandpiper. Males.

Food of the Robin.

No.	Date.	Locality.	Food-Materials.
1	January 3, 1883.	New Castle county, Del.,	Wild grapes.
2	January 8, 1883.	New Castle county, Del.,	Small seeds and remains of beetles.
3	Feb. 18, 1880.	Chester county, Pa., . .	Beetles.
4	March 15, 1879.	Chester county, Pa.. . .	Beetles.
5	March 15, 1879.	Chester county, Pa., . .	Beetles.
6	March 15, 1879.	Chester county, Pa.. . .	Beetles.
7	March 15, 1879.	Chester county, Pa.. . .	Beetles and earthworms.
8	March 15, 1879.	Chester county, Pa., . .	Earthworms.
9	March 15, 1879.	Chester county, Pa., . .	Beetles.
10	March 6, 1880.	East Bradford, Pa.. . . .	Cut-worms.
11	Mar. 8, 10, 1880.	Willistown, Pa..	Small worms (stomach distended).
12	Mar. 8, 10, 1880.	Willistown, Pa., ...	Small worms (stomach distended).
13	Mar. 8, 10, 1880.	Willistown, Pa..	Beetles and small seeds.
14	March 31, 1883.	Chester county, Pa., . .	Beetles, grasshoppers and grub worm.
15	March 31, 1883.	Chester county, Pa., . .	Beetles and larvæ.
16	April 9, 1879.	East Bradford, Pa.. . . .	Beetles.
17	April 9, 1879.	East Bradford, Pa., . . .	Beetles.
18	April 13, 1879.	West Chester, Pa., . . .	Beetles and earthworms.
19	April 13, 1879.	West Chester, Pa.. . . .	Beetles and earthworms.
20	April 22, 1879.	East Bradford, Pa., . . .	Beetles.
21	April 22, 1879.	East Bradford, Pa., . . .	Beetles.
22	April 2, 1880.	East Bradford, Pa., . . .	Beetles.
23	April 7, 1880.	East Bradford, Pa.. . . .	Beetles and earthworms.
24	April 4, 1883.	East Bradford, Pa.. . . .	Beetles.
25	April 12, 1883.	East Bradford, Pa., . . .	Beetles.
26	April 12, 1883.	East Bradford, Pa.. . . .	Beetles and other insects.
27	April 17, 1883.	East Bradford, Pa.. . . .	Beetles.
28	May 4, 1880.	Chester county, Pa., . .	Beetles.
29	May 4, 1880.	Chester county, Pa.. . .	Beetles.
30	May 12, 1880.	Chester county, Pa., . .	Beetles and apterous insects
31	May 12, 1880.	Chester county, Pa., . .	Beetles and earthworms.
32	May 20, 1880.	Chester county, Pa.. . .	Beetles and earthworms.
33	May 5, 1883.	Chester county, Pa., . .	Beetles.
34	May 7, 1883.	Chester county, Pa., . .	Small seeds and flies.
35	May 7, 1883.	Chester county, Pa., . .	Small worms and beetles.
36	May 18, 1883.	Chester county, Pa., . .	Spiders.
37	May 27, 1883.	West Chester, Pa., . . .	Vegetable matter and few particles of oyster shells.
38	July 12, 1880.	West Chester, Pa., . . .	Berries and small seeds.
39	July 12, 1880.	West Chester, Pa., . . .	Small seeds.
40	July 23, 1882.	West Chester, Pa., . . .	Berries and earthworm.
41	August 18, 1880.	West Chester, Pa., . . .	Wild cherries.
42	August 18, 1880.	West Chester, Pa., . . .	Wild cherries.
43	August 20, 1880.	West Chester, Pa., . . .	Wild cherries.
44	August 20, 1880.	West Chester, Pa., . . .	Wild cherries.
45	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
46	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
47	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
48	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
49	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
50	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
51	Sept. 9, 1882.	Chester county, Pa., . .	Wild cherries.
52	Sept. 21, 1882.	Chester county, Pa., . .	Wild cherries.
53	Sept. 21, 1882.	Chester county, Pa., . .	Wild cherries.
54	Sept. 21, 1882.	Chester county, Pa.. . .	Wild cherries.
55	Sept. 21, 1882.	Chester county, Pa., . .	Wild cherries.
56	Sept. 21, 1882.	Chester county, Pa.. . .	Wild cherries.
57	October 2, 1880.	West Chester, Pa., . . .	Spicewood and Dogwood berries.
58	October 2, 1880.	West Chester, Pa., . . .	Spicewood and Dogwood berries.
59	October 2, 1880.	West Chester, Pa.. . . .	Spicewood and Dogwood berries.
60	October 2, 1880.	West Chester, Pa., . . .	Spicewood and Dogwood berries.
61	October 3, 1880.	West Chester, Pa., . . .	Beetles and Dogwood berries.
62	October 3, 1880.	West Chester, Pa., . . .	Beetles and Dogwood berries.
63	October 4, 1880.	West Chester, Pa., . . .	Spicewood berries.
64	October 4, 1880.	West Chester, Pa., . . .	Dogwood berries.
65	October 4, 1880.	West Chester, Pa.. . . .	Dogwood berries.
66	October 8, 1880.	West Chester, Pa., . . .	Dogwood berries and small shells.
67	October 8, 1880.	West Chester, Pa., . . .	Dogwood berries and small seeds.
68	October 8, 1880.	West Chester, Pa., . . .	Dogwood berries.
69	October 8, 1880.	West Chester, Pa.. . . .	Chicken grapes and beetles.
70	October 8, 1880.	West Chester, Pa., . . .	Chicken grapes.
71	October 8, 1880.	West Chester, Pa., . . .	Chicken grapes.
72	October 8, 1880.	West Chester, Pa., . . .	Chicken grapes.
73	Nov. 12, 1884.	East Goshen, Pa., . . .	Beetles and few grub worms.
74	Dec. 20, 1884.	Newark, Delaware, . . .	Berries.
75	Dec. 25, 1884.	Newark, Delaware. . . .	Berries and insects.

Genus **SIALIA** Swainson.

Sialia sialis (Linn.)

Bluebird.

Description (*Plate 50, adults and young*).

Length about 6½; extent about 12½ inches; bill and legs blackish; iris brown.

Adult Male, in summer.—Upper parts uniform azure blue, sides of head, and fore part of chin, blue; throat, breast and sides reddish-brown; abdomen, anal region and under tail-coverts, white.

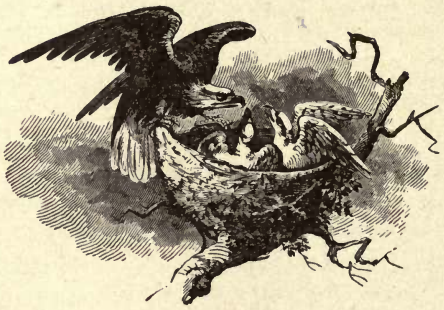
Male, in fall and winter.—Blue duller, feathers of the head, neck and back edged with rusty; white on abdomen more extended; the reddish-brown or chestnut on the throat and breast is darker.

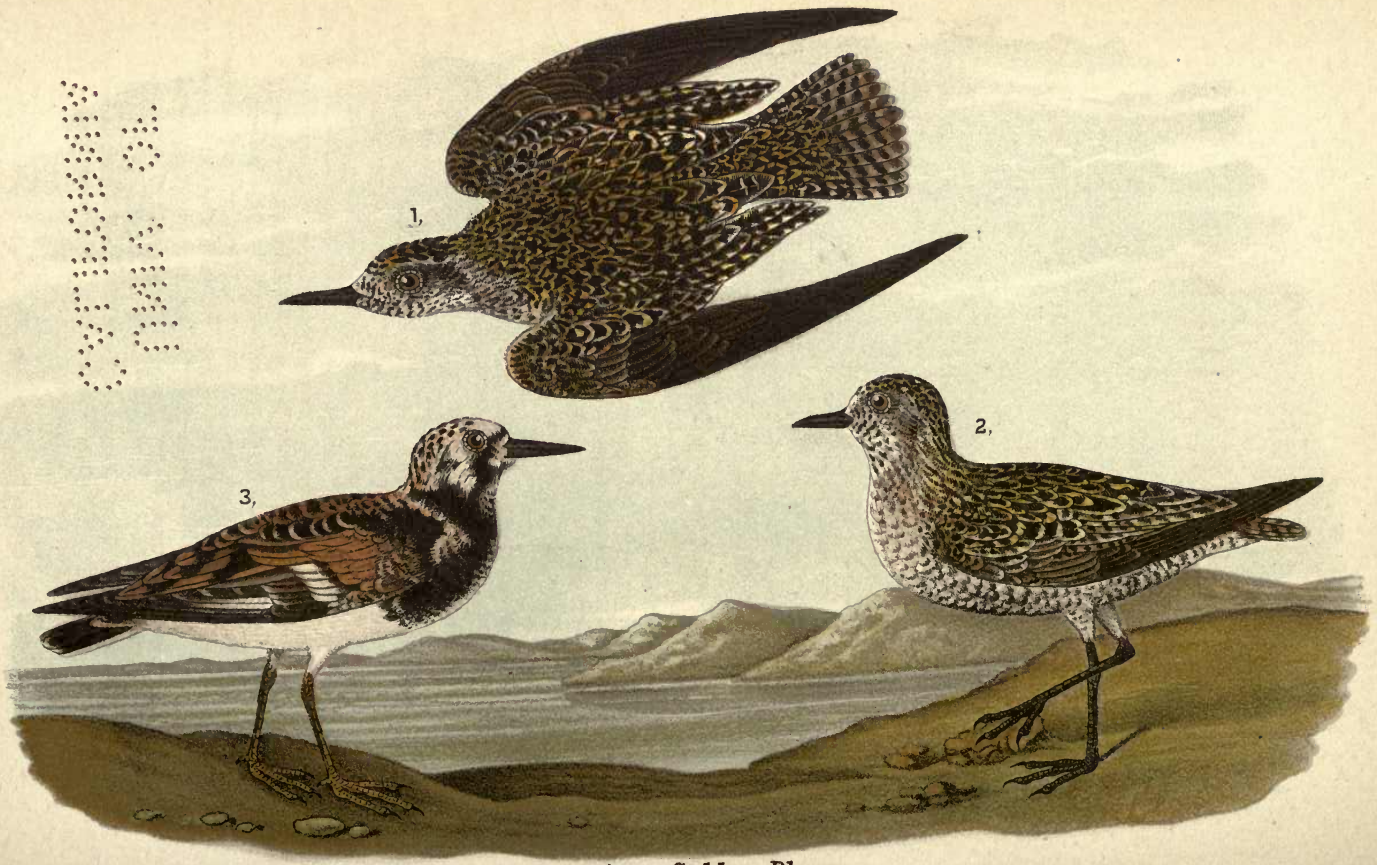
Adult female.—Upper parts dull grayish-blue, brightest on rump, tail and wings; lower parts similar to male but much duller. The young, in first plumage, have wings and tail only blue; top of head and upper parts are grayish or brownish (usually the latter color), middle of back more or less streaked with white; lower parts are whitish (clearest on chin and abdomen); throat, breast and sides are thickly marked with irregular brownish or dusky spots. In this plumage the Bluebird, appears very much like some of the thrushes from the spotted appearance of its breast.

Habitat.—Eastern United States to the eastern base of the Rocky mountains, north to Manitoba, Ontario and Nova Scotia, south, in winter, from the Middle States to the Gulf States and Cuba. Bermudas, resident.

This common and well-known species is found in Pennsylvania during all months of the year, but in the height of the winter season they are much more plentiful in the southern counties than elsewhere in this region. In summer Bluebirds are abundant and generally distributed throughout the state. These birds, when not engaged in building, are usually seen in flocks of from ten to twenty each, sometimes, however, particularly in the fall, they collect together in large numbers, as will be seen from the following extract taken from one of my note books: "October 23, 1884, Girard Manor, Schuylkill county, Penn'a. Bluebirds very abundant; a flock of about two hundred have every day for the past two weeks been observed distributed over the field surrounding the residence of my friend and host M. M. MacMillan, Esq., busily engaged in feeding or dressing their plumage while they perch on the leafless branches of the numerous young trees scattered along the fences. When feeding the birds confine their operations to the ground and feed chiefly on grasshoppers, which are abundant. The fields about here appear to be favorite feeding resorts, as they come in large numbers in the morning, and remain, if not driven away, for about two hours. They also come in the afternoon, but not in such large numbers." The Bluebird builds a scanty and loosely-constructed nest of dried grasses, feathers or other soft materials in holes of trees or stumps, in bird-boxes, or in hollows of posts and fence rails. The eggs, usually four or five in number, are light blue and unspotted. They measure about .81 long by .62 wide. The eggs of this bird sometimes, though very rarely, are white.

Two broods are raised in a season. Since the pestiferous English Sparrows have become so numerous Bluebirds, in common with a number of other species of birds, which formerly were common and regular summer residents about yards, gardens and parks, have been driven away. About three years ago the writer found a pair of Bluebirds, that had been forced to leave a bird box by a flock of pugnacious sparrows, nesting in a hole in a sand bank. The hole in which this pair of birds nested had been used the previous year by a pair of Bank Swallows. When insect-life can be found these birds prefer it to any other diet, but in the winter season when such food is not easily obtained they feed on various small fruits and berries.





1, 2. American Golden Plover.
3. Turnstone. Males.

APPENDIX.

BIRDS OF PREY AND THE "SCALP" ACT OF JUNE 23, 1885.

In an agricultural district, the preservation of the hawks and owls is a matter of great importance. These birds, with few exceptions, subsist mainly on mice, other small quadrupeds and various insects, which are so destructive in the fields, orchards, gardens and about buildings. Until within a quite recent period, Pennsylvania has been burdened with an act of assembly awarding premiums for the destruction of these well-known feathered friends of the farmer. The members of "The West Chester Microscopical Society," recognizing the great wrong and injury which was being accomplished by the enforcement of this odious "Scalp Act," as it was universally called, took an active part in endeavoring to secure its repeal. From reports* issued by their Committee on the Protection of Birds of Prey, the following extracts are taken:

"The committee appointed at the last meeting of the Microscopical Society to take into consideration the act of assembly passed the 23d day of June, A. D. 1885, entitled 'An act for the destruction of wolves, wild cats, foxes, minks, hawks, weasels and owls in this commonwealth,' beg leave to report that the chairman of the committee, Dr. B. H. Warren, ornithologist of the Pennsylvania State Board of Agriculture, has devoted several years of his life to the collection, dissection and examination of birds, and that all of the committee from observation and experience have believed that all of the birds denounced in the law, with rare exceptions, have been found to be the best friends of the farmer. Lest, however, any of the committee might be mistaken they have corresponded with the best ornithologists in the country, men who have made ornithology a study and are connected with that department in the Smithsonian Institution, asking their opinion as to the benefits or injury likely to arise from the execution of the law against the birds therein named.

"They have received answers from Dr. C. Hart Merriam, ornithologist of the United States Department of Agriculture; Dr. Elliott Coues, vice president American Ornithologists' Union; Robert Ridgway, Curator Department of Birds, United States National Museum; Dr. Leonhard Stejneger, assistant curator of the same department; H. W. Henshaw, of the Bureau of Ethnology, also a collector of birds for the Smithsonian Institution, and connected with the late Wheeler Survey of the territories, and Lucien M. Turner, a collector of birds, etc., for the Smithsonian Institution for the last twelve years. These answers, which are annexed to this report, all bear testimony that the hawks and owls are of great benefit to the farmer, and render him far greater service than injury, and that it is unwise to select any of them for destruction.

"The committee regrets to say that there have been ninety odd hawks and a dozen or more owls killed since the law was passed, June 23, 1885, at a cost to this county of about $75, and that the slaughter is still going on.

*Reports of the Microscopical Society of West Chester, Pa., on the act of assembly of said state awarding a premium for the destruction of hawks, owls, minks, weasels, etc., etc., enacted June 23, 1885; published January, 1887.

"Believing, therefore, that the killing of these birds is detrimental to the interests of the agriculturists, they believe that instead of being destroyed they should be protected, and they, therefore, recommend the passage of the following resolution:

"*Resolved by the Microscopical Society of West Chester*, That in the opinion of the society the act of June 23, 1885, offering a premium for the destruction of hawks and owls, is unwise and prejudical to the interest of agriculture, and so far as those birds are concerned, ought to be repealed.

"*Resolved*, That the president and secretary of the society be instructed to forward a copy of the above resolution to our members of the legislature, at its next session, and request their aid towards the repeal of the act so far as is above stated.

"All of which is respectfully submitted.

"B. H. WARREN,
W. TOWNSEND,
THOS. D. DUNN,
JAMES C. SELLERS,
Committee.

"*March 4, 1886.*"

"U. S. DEPARTMENT OF AGRICULTURE,
WASHINGTON, D. C., *March 2, 1886.*

"DR. B. H. WARREN, *Ornithologist of the Pennsylvania State Board of Agriculture:*

"DEAR SIR: Your letter of the 18th inst. has just come to hand. I have read with surprise and indignation the copy sent of section 1, page 141, of the laws of Pennsylvania for 1885, in which a bounty is offered for the destruction of weasels, hawks and owls. The clause purports to have been enacted 'for the benefit of agriculture,' etc.

"The possibility of the passage of such an act by any legislative body is a melancholy comment on the widespread ignorance that prevails even among intelligent persons, concerning the food of our common birds and mammals, and is an evidence of the urgent need of just such systematic and comprehensive investigations as this department is now making on the subject of the relation of food habits to agriculture.

"There are two kinds of weasels in the Eastern States. The smaller kind feeds chiefly on mice and insects, and is not known to kill poultry. The larger also preys mainly upon mice and rats, but in addition sometimes kills rabbits and poultry. Both species are friends of the farmer, for the occasional loss of a few chickens is of trifling consequence compared with the good that these animals are constantly doing in checking the increase of mice.

"You ask my opinion in regard to the beneficial and injurious qualities of the hawks and owls which inhabit Pennsylvania. This question seems almost superfluous in view of the fact that your own investigations, more than those of any other one person, have led to a better knowledge of the food-habits of these birds, and what you have done in the east Prof. Aughey, of Nebraska, has done in the west. Many others have added their 'mites,' till at the present time a sufficient array of facts has been accumulated to enable us to state, without fear of contradiction, that our hawks and owls must be ranked among the best friends of the farmer. With very few exceptions, their food consists of mice and insects, meadow-mice and grasshoppers predominating. The exceptions are the fierce Goshawk from the north, and two smaller resident hawks, Cooper's and the Sharp-shinned, which really destroy many wild birds and some poultry. These three hawks have long tails and short wings, which serve, among other characters, to distinguish them from the beneficial kinds.

"Strange as it may appear to the average farmer, the largest hawks are the ones that do the most good. Foremost among these are the Rough-legged and Marsh Hawks, which do not meddle with poultry and rarely prey upon wild birds.

"Of hawks and owls collectively, it may safely be said that, except in rare instances, the loss they occasion by the destruction of poultry is insignificant in comparison with the benefits derived by the farmer and fruit-grower from their constant vigilance; for when unmolested the one guards his crop by day and the other by night.

"It is earnestly to be hoped that you will succeed not only in causing the repeal of the ill-advised act which provides a bounty for the killing of hawks and owls, but that you will go farther, and secure the enactment of a law which will impose a fine for the slaughter of these useful birds.

"Very truly yours,

"C. HART MERRIAM,
"*Ornithologist of the Department of Agriculture.*"

"UNITED STATES NATIONAL MUSEUM,
"Under Direction of the Smithsonian Institution.
"WASHINGTON, *March 3, 1886.*

"DR. B. H. WARREN, *West Chester, Pa.:*

"DEAR DR. WARREN: I am just in receipt of your letter of the 1st instant, and therefore fear that my reply cannot reach you in time for use at the meeting to-morrow evening. It affords me much pleasure, however, to comply with your request for my views concerning the food-habits of hawks and owls and their relation to man.

"Of all the species which you name there are only two which, according to my best judgment, are at all seriously destructive to game or poultry, these being Cooper's Hawk and the Great-horned Owl. The rest, with the possible exception of the Sharp-shinned Hawk, which certainly is destructive to the smaller birds, my experience leads me to regard as *very decidedly* beneficial to man, their food consisting very largely, if not chiefly, of the smaller rodents, field mice especially. The Red-shouldered and Red-tailed Hawks occasionally pick up a young chicken or rabbit, but I feel quite sure that their service to man far outweighs the injury which they thus do. The little Sparrow Hawk and other smaller species destroy large numbers of grasshoppers, locusts and other large insects.

"Very truly yours,

"ROBERT RIDGWAY,
"*Curator, Dept. Birds.*"

"SMITHSONIAN INSTITUTION,
"WASHINGTON, D. C., *March 3, 1886.*

"DR. B. H. WARREN, *West Chester, Pa.:*

"DEAR DOCTOR: In reply to your letter of the 3d inst., asking for my opinion in regard to the food, etc., of certain hawks and owls specified, I would state that I have read Mr. Robert Ridgway's answer to a similar request from you and that I agree with him in every particular. The idea of persecuting the majority of hawks and owls systematically is simply preposterous, and any law which has for its object their indiscriminate destruction should be immediately repealed, since most of the birds alluded to are among the very best friends of the farmer. In regard to a few species it is well worth while to suspend judgment until a thorough investigation as to their habits and food in your state can be carried out, for, as you are well aware, a species which in some parts of the country and at some seasons may be injurious, in other regions and under altered circumstances may be chiefly beneficial.

"I remain, yours sincerely,

"LEONHARD STEJNEGER,
"*Assistant Curator, Dept. of Birds, U. S. Nat. Mus.*"

Ammodramus henslowii (Aud.).

Henslow's Sparrow.

DESCRIPTION.

A little smaller but very similar to the Grasshopper Sparrow; tail a little longer; top of head heavily streaked with black, divided by pale greenish-gray stripe; occiput and back of neck greenish-gray with black streaks; a blackish streak back of eye, and another one back of lower mandible, throat and belly whitish, conspicuously streaked with black; the breast, sides and flanks are light yellowish-brown; upper surface of wings mostly chestnut; back and scapular feathers chestnut with conspicuous black centers, edged with whitish, except towards the rump, where the edgings are mainly olivaceous or buff.

Habitat.—Eastern United States, west to the plains, north to southern New England and Ontario.

Henslow's Sparrow, according to my observation, occurs in Pennsylvania as a rare spring and fall migrant. It frequents fields and meadows, and it easily escapes notice by hiding in the weeds and grasses. Nests of this species have been taken in our state by Dr. Detwiller, of Bethlehem, and Mr. Roddy, of Millersville. Dr. Coues says it is "common about Washington (D. C.), where it breeds in fields and meadows; nest on the ground in tufts of grass. Eggs, four to five, greenish-white, profusely speckled with reddish, .75 by .57." This sparrow arrives here about the first of May and departs in September. Food about same as that of the Grasshopper Sparrow.

Genus ZONOTRICHIA Swainson.

Zonotrichia leucophrys (Forst.).

White-crowned Sparrow.

DESCRIPTION (*Plate 95*).

Length about 7¼ inches; extent about 10½; *no* yellow on head or wing, as in the next species. Adult may be known by conspicuous black and white head stripes, and the light grayish or ashy markings well shown in plate. "Young, first winter, head-stripes chestnut-brown and dull buff; otherwise similar to adult. Young, first plumage, crown dusky-blackish on sides, the middle whitish, streaked with dusky; throat and breast more or less streaked with dusky."—*Ornith. of Ill. Ridgw.*

Habitat.—North America at large, breeding chiefly in the Rocky mountain region (including Sierra Nevada) and northeast to Labrador.

Regular, but not common spring and fall migrant, and occasionally a few are found during mild winters in the southern parts of the state. This species frequents the same localities as the White-throated Sparrow, but it is less frequently seen in woods and orchards than the last-mentioned bird, being mostly found about brush heaps, along hedgerows and bushy places in fields and near the borders of woods, etc. Its food consists chiefly of small seeds of different grasses, weeds, etc., and it also feeds to some extent on buds and blossoms of different trees, bushes, etc.

1. Red-breasted Nut-hatch.
Male.

2, 3. Purple Martin.
Male and Female.

Zonotrichia albicollis (Gmel.).

White-throated Sparrow.

Description (*Plate 95*).

Size about same as *leucophrys*.

Male.—Two broad black stripes on crown divided by a narrow white line, a showy *yellow stripe*, from bill to middle of eye, joins a white stripe which runs back to the occiput; throat patch white; edge of wing yellow. Upper parts mostly chestnut streaked with black; two showy white wing bars; sides of head, neck in front, and breast, ashy or pale lead color. The female is similar but duller. The young and most specimens taken in autumn have throat, breast, and sides, more or less streaked with dusky. In a large number of specimens before me I see a trace of *yellow* between the eyes and bill, as well as on edge of wing. These yellow markings and the large size are sufficient to identify the species.

Habitat.—Eastern North America, west to the plains, north to Labrador and the Fur Countries. Breeds in northern Michigan, northern New York and northern New England, and winters from the Middle States southward.

This beautiful sparrow, one of our most common spring and fall migrants, is found usually in small flocks about woods, apple orchards, gardens and shrubbery. In the spring, particularly in April, and the early part of May, the White-throats subsist largely, indeed chiefly, on the buds and blossoms of the apple, beech and maple trees. During their vernal migrations they may be observed, singly or in flocks, devouring the tender growth of beech trees, along the edges of woods, particularly those in the neighborhood of running streams. While it is true that the buds and blossoms of apple, maple and some few other trees are eaten, I am quite certain that their favorite articles of diet, in the way of buds and blossoms, are those of the beech trees. The damage which these birds do to apple or other fruit trees is so trifling that the farmer or fruit-grower should not be prejudiced against them. This species feeds also on various small seeds and different insects. The White-throated Sparrow is not uncommon as a winter resident in several of the southern counties of Pennsylvania.

Genus **SPIZELLA** Bonaparte.

Spizella monticola (Gmel.).

Tree Sparrow.

Description (*Plate 94*).

Length about 6 inches; extent about 9½; the long blackish tail feathers are edged with whitish; maxilla dark brown; mandible yellowish; legs brown; toes blackish; crown chestnut (in many specimens the crown feathers, especially in center, are bordered with grayish); broad whitish line over eye, and back of eye a chestnut streak; above, especially middle of back, brownish with dark streaks and paler edgings; lower parts whitish; ashy throat and neck, and brownish on sides and flanks. *No* dusky streaks on lower parts, but a conspicuous dusky *spot* in *middle* of *breast*.

to their food. Two or three species of hawks (those belonging to the genus *Archibuteo*) are notoriously the best diurnal mouse-catchers of all birds. Their habits to soar over the level tracts devoted to grasses and search for their food are so well known that further consideration of them is but repetition of established facts. The bolder species of hawks so rarely commit depredations upon the farm-yard fowls that these instances are, without doubt, the result of an individual predilection for which the entire family should not be branded. The number of rabbits and mice which the hawks annually destroy is simply incredible, as any really observant person will admit.

"In my own opinion, the destruction of the hawks and owls within the State of Pennsylvania will, ere many years, result in an incalculable injury to the farmer, who will be overrun with hordes of mice, which he will be powerless to limit, as their reproductiveness, when undisturbed, progresses with astonishing rapidity.

"It would, in my opinion, be a wise measure to have the act relating to the alleged noxious birds totally repealed.

"Very truly yours,
"LUCIEN M. TURNER."

"AMERICAN ORNITHOLOGISTS' UNION,
"Committee on the Protection of North American Birds.
"NEW YORK, *March 12, 1886.*

"Dr. B. H. WARREN:

"DEAR SIR: The A. O. U. Committee on the Protection of Birds, recognizing the great importance of the report of your Committee on the usefulness of Hawks and Owls to the farmer, has instructed me to purchase, if possible, one hundred copies of the paper containing your report, and to ask if we may have the privilege of reprinting it, either in whole or in part, in the interest of the cause, if at any time we should find it convenient to do so. Your report is directly in the line of our work and could not fail to be a telling influence for good if well circulated.

"Very truly yours,
"EUGENE P. BICKNELL,
"*Secretary.*"

"Dr. A. K. Fisher, assistant ornithologist U. S. Department of Agriculture, Washington, D. C., in a letter dated January 15, 1887, addressed to Dr. B. H. Warren, says: 'Wednesday I received eight adult Red-tails and two Red-shouldered Hawks from a man in Maryland. * * * I find nothing but *mice* and *shrews* in their crops and stomachs (from two to five in each). I found two specimens of *Sorex* and the following specimens of mice: *Mus musculus*, *Hesperomys leucopus*, *Arvicola riparius* and *Arvicola pinetorum*. The hawks had been killed because they had 'killed' chickens and quails."

"The committee also made inquiries of the commissioners of the different counties as to the numbers of birds and mammals that have been killed and for which bounties had been paid, and received answers, up to July 1, 1886, from thirty-four counties. The number of hawks killed and reported up to that date was 9,237, at an expense of $7,335.10, and of owls 2,499, at an expense of $1,303.90.

"In many cases, however, the fees of the magistrates were not included, but merely the bounties paid on the birds. The bounties paid for minks, weasels, foxes and wildcats, raised the sums reported to $15,165.95.

"As the time included in the returns does not come down to date, and as only thirty-four out of sixty-seven counties made reports, it is believed by the committee that the counties pay annually not less than $60,000 under the law of 1885, of which the largest part is paid for the destruction of hawks and owls. That they are the best friends of the farmer, and that their destruction is to him a great disadvantage, the committee thinks that it has already shown, by the letters of eminent ornithologists in its report of March 4 last."

American Goshawk.

1. Adult. 2. Young.

The State Board, through its efficient secretary, Thomas J. Edge, Esq., labored most industriously to show the economic value of the raptorial birds, and secure the repeal of that part of the "Bounty Act" relating to the hawks and owls.

The subjoined report, entitled the "Bounty or 'Scalp' Act of 1885," by Thomas J. Edge, Esq., will give a very clear idea of the efforts made by the State Board through its energetic secretary:

"The Bounty or 'Scalp' Act of 1885.

"During its session of 1885, the Legislature enacted the following act for the destruction of wolves, wildcats, foxes, minks, hawks, weasels and owls in this Commonwealth:

"Section 1. *Be it enacted, etc.*, That for the benefit of agriculture and for the protection of game, within this commonwealth, there is hereby established the following premiums for the destruction of certain noxious animals and birds, to be paid by the respective counties in which the same are slain, namely, for every wildcat two dollars, for every red or gray fox one dollar, for every mink fifty cents, for every weasel fifty cents, for every hawk fifty cents, and for every owl, except the Arcadian, Screech or Barn owl, which is hereby exempted from the provisions of this act, fifty cents.

"Section 2. It shall be the duty of any person, having killed any animal or bird mentioned in the first section of this act, and who is desirous of availing himself of the premiums therein provided, to produce such slain animal or bird before any magistrate, alderman or justice of the peace of the county in which the same was killed, and make affidavit of the time and place of killing the same: *Provided*, That the pelt, if entire from the tip of the nose of any such animal, may be produced in lieu of the same, when so preferred; and upon the reception of any such animal or pelt, or bird, it shall be the duty of such magistrate, alderman or justice of the peace, in the presence of said person killing such animal or bird, and one elector of the county, to cut off the ears of such animal or the head of such bird, and in the presence of said persons burn the same.

"Section 3. Upon the destruction of the ears or heads as aforesaid, the magistrate, alderman or justice of the peace shall give to the person producing such animal or bird, a certificate of compliance with the provisions of this act directed to the commissioners of the county in which such animal or bird was slain, which certificate shall contain the following facts: the kind of animal or bird killed, when, where and by whom killed, and the date by whom and in the presence of what elector the ears of said animal or head of said bird was destroyed, and upon the production of such certificate the said commissioners shall give an order upon the county treasurer for the payment of the premium or premiums provided by this act; and it shall be the further duty of the magistrate, alderman or justice of the peace taking the affidavit, provided in the second section of this act, to file the same forthwith, or cause the same to be filed in the office of the commissioners of the county, and upon filing the same, the said magistrate, alderman or justice of the peace shall receive from the county treasurer, the sum of twenty cents, in full compensation for all services under this act.

"Quite early in 1886, the correspondence of the Board developed the fact that there existed among farmers, taxpayers and the several county officers of the state, a widespread dissatisfaction at the workings and effect of the law. It also was evident that in some one of its many forms, this act would be brought to the notice of the present legislature, and the secretary of the Board deemed it advisable to collect all possible data on either side of the question, and place it in such a form as would be readily available when wanted. As a step in this direction, a circular was prepared and sent to every board of county officers in the state, asking for information upon the following points, viz:

"1. The total amount of bounty actually paid from each county treasury up to November 1, 1886.

"2. The effect (in the opinion of the officers) of the repeal of the law so far as it affects hawks and owls.

"3. The effect of the repeal of the whole law.

"Answers to the first question gives us the following data, which show the amount paid by each county from November 1, 1885, to November 1, 1886. A number of the replies stated that the existence of the act did not become generally known until Janury 1, 1886, and that it would have been more in accordance with their experience to have fixed the time covered from January 1, 1886 to January 1, 1887. A number state that had this latter date been fixed, they would have increased the amount paid fully twenty per cent., and in many cases more was paid in the two months ending December 31, 1886, than in any six preceding months. From this we are inclined to suppose that it will be perfectly safe to increase the amounts given below fully twenty per cent., in order to cover the total amount paid by each county. The reports give the following as the amounts actually paid between the dates given in the circular, viz: from November 1, 1885, to November 1, 1886:

Adams,	$3,800 00	Indiana,	$1,251 00
Allegheny,	53 00	Juniata,	584 50
Armstrong,	1,255 30	Lackawanna,	311 50
Beaver,	282 50	Lancaster,	715 10
Berks,	607 90	Lawrence,	535 90
Blair,	800 00	Lebanon,	202 20
Bradford,	1,666 55	Lehigh,	267 50
Bucks,	444 30	Luzerne,	625 00
Butler,	833 75	Lycoming,	1,039 00
Cambria,	1,181 10	McKean,	1,023 57
Cameron,	130 00	Mercer,	2,319 70
Centre,	1,827 05	Mifflin,	357 60
Chester,	944 50	Montgomery,	85 20
Clearfield.	1,500 00	Northampton,	381 60
Clinton,	325 00	Northumberland,	566 70
Columbia,	900 00	Perry,	1,140 25
Crawford,	8,022 90	Schuylkill,	450 00
Cumberland,	500 00	Somerset,	1,600 00
Dauphin,	450 00	Sullivan,	300 00
Elk,	350 00	Susquehanna,	1,200 00
Erie,	2,746 00	Tioga,	1,169 00
Fayette,	650 00	Union,	410 00
Forest,	350 00	Venango,	952 60
Franklin,	967 00	Warren,	1,893 25
Fulton,	700 00	Washington,	727 50
Greene,	1,200 00	Wyoming,	800 00
Huntingdon,	2,000 00		

"The answers to the second and third queries (the effect of the repeal of the act so far as it applies to hawks and owls, and its total repeal) were answered by the respective county officers as follows:

"REPLIES OF COUNTY COMMISSIONERS.

"*Adams.*—'The law should be repealed except as to wolves, foxes and wild cats; the repeal as to hawks and owls would be a saving to the county of $2,500.'

"*Armstrong.*—'Repeal the whole act.'

"*Allegheny.*—'So far as this county is concerned, its repeal would not affect the number destroyed.'

"*Beaver.*—'The commissioners think that the whole act should be repealed.'

"*Berks.*—'Our opinion is that the whole act should be repealed.'

"*Bucks.*—'Think that the portion as to hawks and owls should be repealed; the balance of the act should remain as it now is.'

"*Bradford.*—'In the opinion of our county commissioners, hawks and owls are more beneficial to farmers than detrimental, but they are of the opinion that the whole act should be repealed for the following reasons:

"'1. It encourages hunting as an occupation.

"'2. Because the motives of self-interest will prompt the destruction of all these animals found doing damage.

"'3. Because of the drain upon the treasury.'

"*Blair.*—'The general impression is that the act should stand as it now is; there is no doubt that it is beneficial in our county and mountain districts. The effect of repealing the whole act would be very injurious, both to crops, domestic and wild game. The law, as a whole, meets with general approval. The expense for the first year seems to be rather burdensome, but in the future it will be much less. There were some three hundred and fifty foxes killed since the law went into effect; and thus it will be a short time until every destructive and noxious animal will be exterminated. What is true with regard to the fox is also true in relation to the others named in the act.'

"*Butler.*—'The act as a whole should stand as it is; that portion relating to hawks and owls should not be repealed.'

"*Cambria.*—'We favor the repeal of the whole law, and especially that portion referring to hawks and owls.'

"*Cameron.*—'The law should be repealed so far as it refers to minks, hawks and owls. It has a tendency to encourage a certain class of men who devote their entire time to hunting.'

"*Centre.*—'We believe the act ought to be repealed as to hawks and owls. The effect of repealing the whole act would be a saving of thousands of dollars to the taxpayers annually. There would be about as many of the destructive mammals and birds killed if the act was repealed, and by persons whose duty it is to protect their property. We emphatically favor repealing the entire act relating to bounties on scalps.'

"*Chester.*—'The opinion of the county commissioners and farmers generally is that the portion of the act referring to hawks and owls should be repealed. As to repealing the whole act, there is a difference of opinion. Many do not favor the repeal as to foxes, minks and weasels. We have paid bounties on the following: Six hundred and sixty-six hawks, sixty owls, two hundred and eight minks, two hundred and forty-eight weasels and one hundred and seven foxes.'

"*Clarion.*—'We believe that the entire act should be repealed. Its repeal would be a benefit to the taxpayers, and no disadvantage to the farmers.'

"*Clearfield.*—'Two-thirds of the amount has been paid upon hawks and owls; minks, hawks and owls should be abandoned; wolves, wild cats and foxes should be retained.'

"*Clinton.*—'Think there might be a bounty on wolves, wild cats and minks; would be satisfied with the repeal of the whole act.'

"*Columbia.*—'Repeal it as to owls, as they feed on mice, etc. The bounty should be continued on hawks, as they feed mainly upon poultry. Repealing the whole act would have no injurious effects; the foxes would be killed in this county just the same. Weasels destroy rats, mice, etc. Those who are injured by minks would kill them just the same without the law.'

"*Crawford.*—'The commissioners are of the opinion that the whole law should be repealed at the earliest possible moment. The commissioners are all farmers, and they consider the destruction of these mammals and birds a great damage to the farmers; they are the farmers' best friends.'

"*Cumberland.*—'We do not see that our county will receive any benefit by continuing in effect any part of the act, and the repeal of the entire act will relieve the county of an unnecessary and unwarranted expense.'

"*Dauphin.*—'The repeal of the act would not affect the destruction of hawks and owls, as farmers, for self-protection, would destroy all they possibly could. Except as to wolves and foxes, we think the law should be repealed.'

"*Elk.*—'Repeal the whole act; there would be just as many killed.'

"*Erie.*—'It is our unanimous opinion that the entire act should be repealed; it is burdensome and inimical to the best interests of the farming community, and a useless expenditure of the county money.'

"*Fayette.*—'No complaints from the people at large. Much trouble to the county officers with the necessary papers, etc.'

"*Forest.*—'It would be wise to repeal the act as far as it refers to hawks, owls and minks.'

"*Franklin.*—'The act ought to be repealed. Twenty-five wild cats, four hundred and twenty-five foxes, one hundred and fifty-five minks, eighty-three weasels, six hundred and seventy-eight hawks and sixty-eight owls.'

"*Fulton.*—'Our opinion is favorable to continuing the law as it now is.'

"*Greene.*—'Repeal the whole act, or at least that portion referring to hawks and owls.'

"*Huntingdon.*—'The law of 1885 should be repealed, and if any law is retained it should be the same as the old law, having the orders directed to the county commissioners instead of to the county treasurers. It makes considerable extra work for the commissioners' clerk, and often puts persons entitled to an order to great inconvenience to have it signed by the county commissioners in order to get the money, as the commissioners in a majority of the counties only meet once each month. A majority of the people in the agricultural districts of this county would oppose a repeal of the act.'

"*Indiana.*—'Our opinion is that the bounty should be taken off everything mentioned in the act of June 23, 1885, and an act passed to pay a bounty for every skunk killed.'

"*Juniata.*—'The entire act should be repealed.'

"*Lackawanna.*—'We think that the whole act should be repealed, as it is a nuisance, especially so far as it refers to hawks and owls.'

"*Lancaster.*—'The repeal of the act would have a good effect so far as our county is concerned.'

"*Lawrence.*—'It is the unanimous opinion of the board that the whole act should be repealed, believing that the law is entirely unnecessary so far as our county is concerned. We have not heard one farmer in the county approve it, but many of them condemn it. Its repeal is earnestly requested by all who have any knowledge of its workings.'

"*Lebanon.*—'The commissioners think that the part of the law referring to owls and hawks should be repealed by all means. Aside (from the above owls and hawks), we pay very little bounty, as foxes and other mammals are not sufficiently numerous to affect our county.'

"*Lehigh.*—'Repeal the whole act if it can be done; if not, then repeal that portion referring to hawks and owls, by all means.'

"*Lycoming.*—'Its repeal would disappoint the farmers in this county. In their opinion, instead of a repeal, skunks or polecats should be added.'

"*McKean.*—'Think that the whole act should be repealed, or at least that part referring to hawks and owls.'

"*Mercer.*—'We are radically in favor of the repeal of the whole act, and in this we are supported by the sentiment of the entire farming community of our county.'

"*Mifflin.*—'We favor the repeal of that portion which relates to hawks and owls, and leaving the remainder as it now is.'

"*Montgomery.*—'The repeal of that portion relating to hawks and owls would be good.'

"*Northampton.*—'We are not in favor of repealing the act, and prefer it as it now stands.'

"*Perry.*—'The repeal of the law would be worse than useless. The money already paid in would be thrown away In the future, fewer mammals and birds will be found and destroyed; the number will gradually decrease each year.'

"*Schuylkill.*—'The repeal or non-repeal of the law is immaterial to us.'

Bald Eagle.
Adult.

"*Susquehanna.*—'Favorable to a repeal of the act.'

"*Tioga.*—'The act referred to is a nuisance, and should be repealed as soon as possible.'

"*Union.*—'The commissioners recommend the repeal of the whole bill, except as to foxes.'

"*Venango.*—'We are in favor of the repeal of the whole act, believing that it would give entire satisfaction to the taxpayers of our county.'

"*Warren.*—'Repeal the whole act by all means.'

"*Washington.*—'It is the opinion of the commissioners that the only damage by hawks and owls is the destruction of our game birds, which is only felt by hunters; on the other hand, by the destruction of mice and other small vermin, they are beneficial to the farmer. The repeal of the whole act would be beneficial to our farmers.'

"*Wyoming.*—'The effect of the repeal would be good.'

"A number of the commissioners have appended to their reports a list of the number of each kind of mammal or bird upon which bounty has been paid. As indicative of the relative proportion of the bounties upon each, we give the following:

"*Chester.*—Hawks, 666; owls, 60; minks, 208; weasels, 248, and foxes 107.

"*Franklin.*—Hawks, 678; owls, 68; wild cats, 25; foxes, 425; minks, 155, and weasels, 83.

"Several of the commissioners state that the premiums upon hawks and owls constitute more than fifty per cent. of the total amount paid, while several of the commissioners call attention to the fact that wolves are enumerated in the title, but are not provided for in the body of the bill.

"In addition to the collection of data in this direction the ornithologist of the Board, Dr. B. H. Warren, of West Chester, Pa., also had his attention directed to the actual results of the effect of the law: First, as it relates to hawks and owls, and, second, as a whole. The data which was collected by him is partially shown in an article in another portion of this report, and in a lecture delivered at the annual meeting of the board in January last.

"As a condensation of a large amount of correspondence upon this subject, which has reached the office of the Board during the past year, we give the following as covering the main points:

"This act should be repealed because—

"1. It causes a drain upon the treasuries of the respective counties which is not warranted by the results produced.

"2. Hawks and owls, by the destruction of insects, confer a benefit which is much more than an offset for the poultry destroyed by them.

"3. Increased duties are imposed upon county officers, for which no additional compensation has been provided.

"4. In a number of cases county officers have been imposed on, and bounties illegally drawn.

"5. It encourages a certain class to follow hunting as a means of livelihood, and to the exclusion of other labor.

"6. Self-interest would lead to the destruction of nearly as many of these noxious mammals and birds.

"7. The repeal of the act will, by the increase of the number of hawks, cause greater destruction of field mice, which destroy large amounts of clover and clover roots each year.

"The payment of bounties for any purpose is based upon wrong principles, and should be discouraged.

"The act should not be repealed because—

"1. This being the first year of its action, the total amount paid will be greatly in excess of that of any subsequent year, and owing to the increased scarcity each year, the amount paid will be annually less.

"2. By a repeal the good effects of bounties already paid would be practically lost

"3. The destruction of these birds and mammals protects game.

"4. All laws are liable to abuse and violation, and this one is no exception to the general rule.

"5. The effect of a continuance of the law as it now is will be to increase the production of poultry and decrease its price."

From letters kindly sent by the commissioners of the several counties hereafter named, I am enabled to show part of the animals on which bounty was paid for a period of some six months, *i. e.*, from January 1, 1886, to July 1, 1886. From reliable informants I find that the "Scalp Act" was not generally known to be in existence until about January 1, 1886:

Allegheny.—4 "cat" owls, *i. e.*, Great-horned Owls.

Armstrong.—167 hawks; 49 owls, "also quite an amount for foxes, minks and weasels."

Adams.—"We have paid since the first of October, 1885, to July 3, 1886, for 1,716 hawks, 402 owls, or $858.00 for hawks, and $201.00 for owls; total, $1,059.00. The premiums on weasels, minks and foxes are about one-third of the above. A bad feature about the act is the apparent manner in which the counties are imposed upon, in farming hawks, owls, foxes, etc."

Bucks.—138 hawks; 16 owls.

Bradford.—Total amount paid for all animals from January 8, 1886, to August 1, 1886, inclusive, $996.00. "One-half for hawks and owls, balance for weasels, minks and foxes."

Blair.—123 hawks; 13 owls.

Beaver.—25 hawks; 12 owls.

Clarion.—165 hawks; 20 owls.

Centre.—119 hawks; 26 owls.

Cameron.—3 hawks; 2 owls.

Clinton.—34 hawks; 8 owls.

Crawford.—"Bounty account not kept so as to show how many of each kind paid for; the first five months they were very equally divided, but in May and June hawks, weasels and owls predominated; hawks leading the list. We paid the first bounty on a fox November, 1885, $1.00; December, $275.90; January, 1886, $279.20; February, $182.00; March, $207.00; April, $236.40; May, $347.60; June, $1,079.00; total, $2,608.10, including justices' fees."

Chester.—1885—11 hawks; 6 minks; 5 weasels; 1 fox. 1886—from January 1 to December, inclusive, 666 hawks; 60 owls; 107 foxes; 208 minks; 248 weasels. 1887—from January 1 to March 18, inclusive, 289 hawks; 79 owls; 84 minks; 7 foxes; 199 weasels.

Delaware.—3 hawks; 3 foxes.

Erie.—414 hawks; 225 owls; 107 foxes. "It is rapidly on the increase; one-fifth of the whole number has been within the last two weeks." This letter was dated July 13, 1887.

Fayette.—278 hawks; 80 owls; 82 foxes; 24 minks; 6 wild cats.

Forest.—110 foxes; 37 hawks; owls 2.

Franklin.—In 1885, 24 wild cats; 278 foxes; 97 minks; 22 hawks; 9 weasels; 2 owls. In 1886, from January 1 to July 1, 9 wild cats; 287 foxes; 76 minks; 123 hawks; 22 weasels; 30 owls.

Huntingdon.—64 owls; 347 hawks; 56 minks; 38 weasels; 362 foxes; 12 wild cats.

Indiana.—350 foxes; 250 weasels; 300 hawks; 150 owls.

Juniata.—150 hawks; 70 foxes; 20 owls.

Lackawanna.—70 foxes; 30 hawks; 5 weasels; 7 wild cats; 25 minks.

Lycoming.—700 hawks and owls; 250 foxes. "We pay about $115.00 per month for destroying the above-named animals."

Mifflin.—71 hawks; 14 owls; 17 weasels; 14 minks.

Montour.—"Paid for all animals $161.40."

Mercer.—"Our people did not become apprised of the passage of the act to which you refer until some time after its approval, and as a result we did not have any certificates presented until after the first of December, 1885. Since that time we have

1. Pigeon Hawk. 2. Duck Hawk.

Males.

paid out $1,300.00, and of this amount fully $1,000.00 has been paid for hawks and owls, mostly hawks; have not paid for more than 10 or 12 foxes."

McKean.—17 wild cats; 137 foxes; 115 minks; 120 hawks; 81 owls; 22 weasels.

Montgomery.—42 hawks; 8 foxes; 3 owls.

Pike.—32 hawks; 4 owls; 63 foxes; 9 weasels; 14 minks; 4 wild cats.

Perry.—465 hawks; owls, 62; foxes, 453; 130 minks; 52 weasels. Killed during 1885 (December) and to date, July 6, 1886."

Somerset.—14 wild cats; 69 owls; 410 hawks; 250 weasels; 215 minks; 270 foxes. Magistrates' fees, $129.75.

Sullivan.—46 hawks and owls; 49 foxes.

Susquehanna.—In 1885, 19 foxes; 4 minks; 5 weasels; 2 hawks; 4 owls. January 1 to July 5, 1886, foxes, 217; minks, 171; weasels, 83; hawks, 223; owls, 55.

Union.—Hawks, $43.40; owls, $12.60; minks, $21.00; weasels, $11.60; fees included.

Venango.—126 hawks; 28 owls; 102 foxes.

In connection with the above I give the additional facts. Centre county for the year 1886 paid $1,529.00 as follows: 1,356 skunks at 50 cents; 377 foxes; 383 hawks; 172 weasels; 57 owls; 13 wild cats; 712 scalp affidavits at 20 cents. From the large number of skunks returned it would appear that this county has a "special act," which allows bounty for these animals. Delaware county, on December 22, 1886, had paid bounty on 3 foxes; 22 hawks and 1 weasel. Perry county for 1886 paid for foxes, minks, weasels and wild cats $468.85, and for hawks and owls $760.60. Chester county for 1886 paid $1,159.30 for 827 hawks, 108 owls, 231 minks, 334 weasels, 111 foxes and $288.30 for affidavits. The largest amount of bounty was paid by Crawford county, which was forced to make an outlay of over *ten thousand dollars*, a large portion of which was for hawks and owls. In conclusion I might add that by the enforcement of this unjust legislative act the county treasuries, in a period of about eighteen months, were depleted to the extent of over $100,000, of which sum, probably, not less than $75,000 were paid for the destruction of hawks and owls. Agriculturists, naturalists and others engaged in the protection of these birds are under great obligations to the able chairman of the Senate Agricultural Committee, Hon. A. D. Harlan, of Chester county, Pa. Senator Harlan, after being in receipt of numerous resolutions passed by farmers' clubs, institutes and grange organizations throughout this commonwealth, when waited upon by members of the State Agricultural Board and a committee of naturalists, and being convinced that the preservation of raptorial birds was of utility to the farmer as well as gratifying to the scientist, at once gave his careful attention to the matter, and by his earnestness and industry in his committee and of the body of which he is a member, did very much to secure the repeal of this pernicious statute.

FOOD OF HAWKS AND OWLS.*

By Dr. A. K. FISHER, *Assistant Ornithologist.*

The present brief synopsis of results, which is preliminary to a special report now in preparation on the food habits of the hawks and owls of the United States, is based on the examination of 1,072 stomachs, 651 of which are in the possession of the department. Of the 421 stomachs not in the department collection, the greater number were examined by Dr. B. H. Warren, state ornithologist of Pennsylvania, and other members of the American Ornithologists' Union. The remainder were compiled from Professor Samuel Aughey's "Notes on the Nature of the Food of the Birds of Nebraska,"† and Mr. Edward Swift's recent article on "The Food of Rapacious Birds."‡

Of the 1,072 stomachs examined, 89 were empty. Of the 983 containing food, 57 contained poultry; 20, game birds; 177, other birds; 528, mice; 137, other mammals; 51, reptiles and batrachians, and 255, insects. On looking at the following tables it will be seen that certain species feed principally on mice and insects, while others feed chiefly on poultry and small birds. In the latter category, fortunately, there are but 5 species in the eastern states, namely, the Sharp-shinned, Cooper's, Duck, and Pigeon Hawks, and the Great-Horned Owl. Taking out the 126 stomachs of these five species, there remain 857 stomachs of 23 species, of which 31 contained poultry; 11, game birds; 109, other birds; 518, mice; 125, other mammals; 49, reptiles and batrachians, and 241, insects. In other words, poultry was found in but 3.6 per cent. of the 857 stomachs, while mice were found in 64.4 per cent.

In the accompanying table the names of the animals found in the stomachs are given in general terms, such as *mouse*, *mole*, *shrew*. In nearly all cases (more than 99 per cent.) the exact species of each has been determined and recorded, and will be given in the final report. This is important, inasmuch as allied species often differ in economic consequence. Some small mammals are beneficial, and the injurious species are harmful in different degrees, according to their food habits and the character of the places which they inhabit.

The following persons have contributed stomachs of hawks and owls to the department collection: Dr. W. C. Avery, Vernon Bailey, W. B. Barrows, F. M. Chapman, Hubert L. Clark, William Couper, F. T. Cuthbert, E. O. Damon, L. M. Davies, J. L. Davison, F. J. Dixon, William F. Doertenbach, William Dutcher, Jonathan Dwight, Jr., Dr. A. K. Fisher, W. K. Fisher, M. M. Green, C. C. Hanmer, E. M. Hasbrouck, A. H. Hawley, J. H. Hendrickson, W. F. Hendrickson, H. W. Henshaw, H. K. James, C. A. Keeler, William G. W. Leizear, J. B. Lewis, William Lloyd, F. A. Lucas, Dr. C. Hart Merriam, G. S. Miller, Jr., H. H. Miller, J. Percy Moore, F. S. Place, Charles W. Richmond, Robert Ridgway, C. B. Riker, John H. Sage, W. E. Saunders, J. M. Shaffer, Dr. Hugh M. Smith, R. W. Smith, F. Stephens, Willard E. Treat, Dr. B. H. Warren, F. S. Webster, H. G. White, Otto Widmann, A. H. Wood.

*Food of hawks and owls. By Dr. A. K. Fisher, assistant ornithologist. From annual report, United States Department Agriculture for 1887. Washington, D. C., pp. 402–422.

† First annual report of United States Entomological Commission, Appendix, pp. 42–46, 1878.

‡ Forest and Stream, Vol. XXX, No. 6, March 1, 1888, p. 104.

STATEMENT OF THE STOMACH CONTENTS OF MORE THAN 1,000 HAWKS AND OWLS.

[In Dr. Warren's specimens, the star (*) indicates that the stomach contained food of the character specified in the column-heading under which it occurs, but that its specific identity was not determined.]

SWALLOW-TAILED KITE (*Elanoides forficatus*).

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Hawkinsville, Fla.,	Mar. 31, 1885,	.....	.....	.....	Lizard; tree-toad; grass hoppers; beetles.
Do.	do.	.....	.....	.....	Lizard; grasshoppers; beetles.
Dixon county, Neb.,	June —, 1865,	.....	.....	.....	60 locusts, 5 other insects.
Do.	do.	.....	.....	.....	69 locusts, 3 other insects.
Sarpy county, Neb.,	Sept. —, 1873,	.....	.....	.....	75 insects.

Summary.—Of 5 stomachs examined 5 contained insects; 2, lizards; 1, tree-toad.

MISSISSIPPI KITE (*Ictinea mississippiensis*).

Madisonville, La.,	May 29, 1886,	.....	.....	.....	Fragments.
Do.	May 30, 1886,	.....	.....	.....	Beetles.

Summary.—Of the 2 stomachs examined, both contained insects.

MARSH HAWK (*Circus hudsonius.*)

Amityville, L. I., N. Y.,	Oct. 17, 1885,	.....	.....	Meadow mouse.	
Washington, D. C.,	Oct. 29, 1886,	.....	.....	3 meadow mice.	
Bergen county, N. J.,	Nov. 26, 1885,	.....	.....	Meadow mouse.	
Washington, D. C.,	Jan. —, 1887,	.....	.....	do.	
Sandy Spring, Md.,	Feb. 11, 1887,	.....	Junco.		
Do.	Oct. 2, 1887,	.....	.....	Meadow mouse.	
Do.	Oct. 14, 1887,	.....	.....	do.	
Do.	Nov. 17, 1887,	.....	.....	2 pine mice; 2 meadow mice.	
Do.	Nov. 18, 1887,	.....	Tree sparrow,	Pine mouse; 2 meadow mice.	
Do.	Nov. 23, 1887,	.....	.....	Meadow mouse.	
Travare, Dak.,	July 5, 1887,	.....	.....	2 striped gophers.	
Pembina, Dak.,	July 30, 1887,	.....	.....	Striped gopher.	
Do.	do.	.....	.....	Hair of striped gopher.	
Do.	do.	.....	.....	Striped gopher.	
Oakdale, N. Y.,	Oct. 4, 1887,	.....	.....	Shrew.	
Long Island City, N. Y.	Oct. 18, 1887,	.....	.....	2 meadow mice.	
East Hartford, Conn.,	Sept. 17, 1887,	Duck.			
Cromwell, Conn.,	Oct. 5, 1886,	.....	.....	Meadow mouse.	
Devil's Lake, Dak.,	Aug. 11, 1887,	.....	.....	Striped gopher.	
Do.	Aug. 17, 1887,	.....	.....	Meadow mouse.	
Sandy Spring, Md.,	Oct. 17, 1887,	.....	.....	do.	
Do.	Feb. 13, 1887,	.....	.....	.....	Empty
Sing Sing, N. Y.,	Oct. 1, 1881,	Fowl.			
Do.	Sept. 17, 1882,	.....	Small bird.		
Wethersfield, Conn.,	Sept. 17, 1887,	.....	.....	Mice.	
Do.	Sept. 24, 1887,	.....	Small bird.	do.	
East Hartford, Conn.,	Nov. 12, 1886,	.....	.....	3 meadow mice.	
Do.	Oct. 17, 1886,	.....	.....	2 meadow mice.	
Paint Rock, Texas.	Dec. 7, 1886,	.....	.....	Skunk.	
Washington, D. C.,	Sept. 11, 1886,	Fowl.			
East Bradford, Pa.,	Aug. 22, 1878,	.....	.....	Mice.	
Westtown, Pa.,	Aug. 30, 1878,	.....	2 warblers,	do.	
Oxford, Pa.,	Nov. 5, 1879,	.....	.....	do.	
Brazile Creek, Neb.,	Oct. —, 1869,	.....	.....	.....	Reptiles; 69 insects.
Do.	do.	.....	.....	.....	15 locusts, 77 other insects.
Otoe county, Neb.,	Sept. —, 1864.	.....	.....	.....	71 locusts, 10 other insects.

MARSH HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sarpy county, Neb.,	Sept. —, 1864.				Lizard; 69 locusts.
Do.	do.			Gopher,	51 locusts.
Douglas county, Neb.,	Oct. —, 1864,				Lizards; 43 locusts.
Elmira, N. Y.	May 7, 1886.			4 mice.	
Do.	July 11, 1886,			Mouse,	Beetles.
Tyrone, N. Y.,	Aug. 17, 1886.			Red squirrel.	
Do.	do.			Field mice.	
Barton, N. Y.,	Aug. 1, 1886,	Woodcock,			Beetles.
Hale county, Ala.,	Mar. 17, 1888,	Quail.			
Washington, D. C.,	Mar. 28, 1888.			Meadow mouse.	

Summary.—Of 46 stomachs examined, 5 contained poultry or game birds; 5, other birds; 24, mice: 9 other mammals; 3, reptiles; 8, insects, and 1 was empty. Twenty-two stomachs examined by the division contained 21 mice.

SHARP-SHINNED HAWK (*Accipiter velox*).

Sing Sing, N. Y.,	Sept. 10, 1885,				Empty.
Do.	Sept. 17, 1885,		2 warblers.		
Do.	do.		Warbler.		
Do.	Sept. 24, 1885,		Field sparrow.		
Southold, N. Y.,	Nov. 20, 1885,		Chipping, purple grackle.		
Alfred Centre, N. Y.,	Sept. 17, 1885,		Warbler.		
Taunton, Mass.,	Oct. 6, 1885,		Goldfinch.		
Do.	Nov. 21, 1885,		2 small birds.		
Sing Sing, N. Y.,	Sept. 25, 1886,		Junco and kinglet.		
Peterborough, N. Y.,	July 22, 1886,		Small bird.		
Portland, Conn.,	Mar. 27, 1886,		Robin.		
Maplewood, N. J.,	May 25, 1886,		Oriole; swift		
Montgomery co., Pa.,	Sept. 18, 1886,		Small bird.		
Woodstock, Conn.,	May 2, 1887,		do.		
Long Island City, N. Y.	Sept. 21. 1887.		English sparrow; warbler.		
Greensborough, Ala.,	Nov. 11, 1887,		White-throated sparrow.		
Middletown, Conn.,	Jan. 19, 1887,		2 English sparrows.		
Portland, Conn.,	Apr. 2, 1887,		Robin.		
Do.	Oct. 20, 1887,		Field sparrow.		
Fort Buford, Dak.,	Sept. 9, 1887,		Thrush.		
Washington, D. C.,	Dec. 31, 1887,		White-throated sparrow.		
Sing Sing, N. Y.,	Apr. 7, 1880.		Robin.		
East Hartford, Conn.,	Oct. 17, 1886,		Warbler.		
Easthampton, Mass.,	May 9, 1874,		Junco.		
South Windsor, Conn.,	Nov. 4, 1887.				
Portland, Conn.,	Nov. 8, 1886,				Empty.
Do.	Feb. 4, 1881,		Goldfinch,		do.
Fort Buford, Dak.,	Sept. —, 1887,		Dove.		
Sandy Spring, Md.,	Apr. 23, 1887.				
Do.	do.				do.
Do.	do.		Bluebird,		do.
Do.	Sept. 20, 1887.				
Do.	Sept. 26, 1887,		Small bird,		do.
Do.	Oct. 2, 1887.				
Do.	Nov. 5, 1887,				do.
Do.	Nov. 22, 1887,				do.
Chester county, Pa.,	Nov. 26, 1886,		Fox sparrow; song sparrow.		do.
Do.	Sept. 20, 1884,		Field sparrow,		Beetles.
Do.	Sept. 28, 1880,	Quail.			
Do.	Sept. 10, 1874,		English sparrow,	Mice.	
Do.	Oct. —, 1875,		*	do.	
Do.	Feb. 16, 1880,			do.	
Do.	May 19, 1881,	Poultry			Insects.
Elmira, N. Y.	Mar. 4, 1886,		English sparrow,	Mouse.	
Do.	Apr. 18, 1886,		Small bird.		
Big Flats, N. Y.	Sept. 23, 1886,		English sparrow.		
Do.	do.				Indeterminate.
Gainesville, Fla.,	Dec. 22, 1887,				Empty.

Summary.—Of 48 stomachs examined, 2 contained poultry and game birds; 35, other birds; 4, mice; 2, insects; and 10 were empty. Total number of small birds, 41.

1. American Long-eared Owl.
2. Short-eared Owl. Males.

COOPER'S HAWK (*Accipiter cooperi*).

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Taunton, Mass.	Sept. 21, 1885.	.....	Chewink.		
Do.	Oct. 6, 1885,	.....	do.	.....	1 grasshopper.
River Vale, N. J.	Sept. 18, 1886.				
Washington, D. C.	Nov. 28, 1886.	.....	Tree sparrow.		
Sing Sing, N. Y.	Sept. 7, 1880,	Chicken			
Do.	Nov. 18, 1884,	do.			
Greensborough, Ala.	Oct. 28, 1887,	.....	.....	.....	Empty.
Do.	Mar. 6, 1887,	Pigeon.			
Do.	July —, 1887,	do.			
Do.	Aug. 4, 1887,	do.	.....	.....	do.
Do.	Aug. 30, 1887.				
Do.	Sept. 13, 1887,	Pigeon.	.....	.....	Sand lizard.
Do.	Sept. 27, 1887,	.....	.....	.....	Empty.
Wetherfield, Conn.	Sept. 9, 1887,	.....	.....	.....	do.
East Hartford, Conn.	July 31, 1887.	.....	.....	.....	do.
Sandy Spring, Md.	Jan. 14, 1887,	Quail.			
Do.	Mar. 1. 1887,	.....	Song sparrow.		
Do.	Apr. 22, 1887,	Chicken			
Do.	May 7, 1887,	do.	.....	.....	do.
Do.	May 25, 1887,	.....	.....	.....	do.
Do.	Sept. 14, 1887,	.....	.....	.....	do.
Do.	Sept. 21, 1887.				
Do.	Nov. 24, 1887,	.....	Purple grackle.		
Do.	Dec. 26, 1887,	Quail.			
Do.	Jan. 30, 1888,	do.			
Do.	Feb. 11, 1888,	.....	Junco; Savanna sparrow.		
Chester county, Pa.	Nov. 13, 1886,	.....	Junco.		
Do.	Nov. 27, 1886,	.....	Small bird.		
Do.	Dec. 17, 1886,	Chicken			
Do.	Jan. 10, 1887,	.....	Small bird.		
Do.	Jan. 17, 1887,	.....	.....	.....	Empty.
Do.	Feb. 1, 1887,	.....	Small bird.		
Do.	Feb. 20, 1887,	Chicken			
Do.	Mar. 3, 1887,	.....	Meadow lark.		
Do.	Dec. 6, 1878,	.....	*		
New Castle co., Del.	Nov. 1. 1878.	Poultry			
Willistown, Pa.	Dec. 6, 1878,	.....	*		
East Bradford, Pa.	May 25, 1875,	.....	.....	.....	Frog.
East Goshen, Pa.	May 20, 1877,	.....	.....	Mice, ...	Coleoptera
West Chester, Pa.	Aug. 25, 1876,	.....	English sparrow.		
Pocopson, Pa.	Nov. 12, 1879,	Poultry			
West Chester, Pa.	Sept. 10, 1880,	.....	English sparrow.		
Sandy Spring, Md.	Mar. 17, 1888,	.....	Sparrow.		
Gainesville, Fla.	Dec. 22, 1887,	.....	.....	.....	Empty.
Sandy Spring, Md.	Mar. 24, 1888,	.....	Song sparrow.		
Do.	Apr. 2, 1888.	.....	.....	.....	do.

Summary.—Of 46 stomachs examined, 15 contained poultry or game birds; 17, other birds; 1, mice; 1, frog; 1, lizard; 2, insects, and 11 were empty.

GOSHAWK (*Accipiter atricapillus*).

Sandy Spring, Md.	Dec. 27, 1887,	.....	.....	Rabbit.	
Adirondack, N. Y.	Oct. 31, 1882.	.....	.....	2 red squirrels.	
Philadelphia, Pa.	Jan. 12, 1886,	.....	.....	Rabbit	
Dixon and Ceder counties, Nebr.	Aug. —, 1867,	.....	.....	do.	Few locusts.
Tioga, Pa.	Feb. 17, 1886,	.....	.....	Mouse; weasel.	
Elmira, N. Y.	Apr. 12, 1886.	.....	.....	Mice.	Beetles.

Summary.—Of 6 stomachs examined, 2 contained mice; 5, other mammals; 2, insects.

RED-TAILED HAWK (*Buteo borealis*).

Taunton, Mass.	Nov. 18, 1885,	.....	Feathers.		
Portland, Conn.	Sept. 4, 1885,	.....	.....	.....	2 adders; ribbon snakes; toad.
Do.	Nov. 25, 1885,	Fowl.			
Alfred Centre, N. Y.	Aug. 28, 1886,	.....	.....	.....	Grasshoppers.
Do.	Oct. 25, 1886,	.....	.....	Shrew.	
Peterborough, N. Y.	July 5, 1886,	Fowl.			
Oneida Lake, N. Y.	Aug. 30, 1886,	.....	.....	Red squirrel.	
Morrisville, N. Y.	Sept. 27, 1886,	.....	.....	Meadow mouse.	
Chester county Pa.	May 15. 1886,	Fowl.	Oriole.	Rabbit.	Grubs.
Do.	Mar. 10, 1886,	.....	.....	Meadow mouse.	

RED-TAILED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Birmingham, Pa.	Mar. 15, 1886,	Fowl.	Grackle.		
Portland, Conn.	July 25, 1886,				Empty.
Chickamauga, Tenn.	Feb. 13, 1886,				Offal.
Lockport, N. Y.	July 13, 1886,			4 meadow mice,	Toad; 2 beetles.
Forge, Suffolk county, N. Y.	Feb. 16, 1887,	Fowl.			
Whitewater, Wis.	Aug. 17, 1887,			Meadow mouse,	13 grasshoppers; 5 crickets; 1 beetle; 1 crawfish.
Washington, D. C.	May 4, 1887,			Pine mouse; meadow mouse.	Large adder.
Middletown, Conn.	Nov. 20, 1886,			Mouse,	5 grasshoppers.
Portland, Conn.	Dec. 29, 1886,			Gray squirrel.	
Gainesville, Va.	Jan. 2, 1888,			2 house mice.	
Howard county, Md.	Nov. 3, 1887,				Empty.
Washington, D. C.	Dec. 29, 1887.		Song sparrow.	Meadow mouse.	
Do.	Jan. 20, 1888.			House mouse; 3 meadow mice.	
Sing Sing, N. Y.	Feb. 18, 1885,			4 meadow mice; 2 white-footed mice; shrew.	
Do.	Apr. 13, 1885,			2 shrews.	
Lewis county, N. Y.	Aug. 3, 1876,				Garter snake.
Portland, Conn.	Mar. 2, 1887.				Empty.
Troy, Pa.			Sreech owl.		
Devil's Lake, Dak.	Aug. 11, 1887,			Gray gopher; striped gopher.	Frogs; 10 large grasshoppers.
East Hartford, Conn.	Sept. 14, 1885,				2 frogs; potato beetle.
Sandy Spring, Md.	Jan. 8, 1887,			Pine mouse; shrew.	
Do.	do.			2 meadow mice.	
Do.	do.			Meadow mouse; white-footed mouse; shrew.	
Do.	do.			4 house mice; 1 meadow mouse.	
Do.	do.			3 house mice; 1 meadow mouse; shrew.	
Do.	do.			3 meadow mice.	
Do.	do.			3 meadow mice; 3 shrews.	
Do.	do.			1 house mouse; 2 pine mice; 2 meadow mice; 1 shrew.	
Do.	Jan. 14, 1887,				Empty.
Do.	do.			1 pine mouse; 2 meadow mice.	
Do.	Jan. 22, 1887,			Meadow mouse.	
Do.	do.			do.	
Do.	do.			do.	
Do.	Jan. 28, 1887,			do.	
Do.	do.		Crow,	do.	
Do.	do.		do.		
Do.	Feb. 11, 1887,				do.
Do.	do.			Meadow mouse.	Larva.
Do.	do.			Pine mouse; meadow mouse.	
Do.	Mar. 2, 1887.			Shrew.	
Do.	do.				do.
Do.	do.			Meadow mouse; 2 house mice.	
Do.	do.			1 meadow mouse; 1 house mouse.	
Do.	do.			2 meadow mice; gray squirrel.	
Do.	do.			Meadow mouse.	
Do.	do.			Shrew.	
Do.	Mar. 2, 1887,				Empty.
Do.	do.	Fowl.			
Do.	do.			5 meadow mice.	
Do.	do.		Bluebird,	Meadow mouse.	
Do.	do.		Tree sparrow,		Grasshopper
Do.	do.			Meadow mouse.	
Do.	do.			do.	
Do.	Mar. 5, 1887,		2 song sparrows.	do.	
Do.	do.			Meadow mouse; white-footed mouse; mole.	
Do.	do.		Song sparrow.	Rabbit.	
Do.	do.		Feathers,		
Do.	do.				Empty.

RED-TAILED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md.,	Mar. 5, 1887,			2 meadow mice; rabbit.	
Do.	Mar. 8-10, 1887,			Meadow mouse,	2 wood frogs.
Do.	do.			do.	
Do.	do.				Empty,
Do.	do.			3 meadow mice.	
Do.	do.			2 moles.	
Do.	do.			Shrew.	
Do.	do.			Rabbit.	
Do.	do.			do.	
Do.	do.			Gray squirrel.	
Do.	do.			Meadow mouse; chipmunk.	Crawfish.
Do.	Mar. 12, 1887,		Feathers.		
Do.	Mar. 18, 1887,		Robin,	Meadow mouse.	
Do.	Mar. 24, 1887,			3 meadow mice.	
Do.	April 1, 1887,		2 sparrows,	Meadow mice.	
Do.	do.			Pine mouse.	
Do.	Apr. 25, 1887,			Mole,	Insect remains.
Do.	Apr. 28, 1887,			Meadow mouse; gray squirrel.	
Do.	Nov. 14, 1887,				Empty.
Do.	do.				do.
Do.	do.				do.
Do.	Nov. 27, 1887,			Gray squirrel.	
Do.	Dec. 12, 1887,				do.
Do.	do.			House mouse.	
Do.	Dec. 24, 1887,			2 meadow mice.	
Do.	Dec. 26, 1887.				do.
Do.	do.			1 house mouse; 1 meadow mouse; 3 shrews.	
Do.	do.			Meadow mouse.	
Do.	do.				do
Do.	Jan. 3, 1888,			2 Meadow mice.	
Do.	Jan. 7, 1888,			Meadow mouse.	
Do.	Jan. 14, 1888,		Meadowlark,	3 meadow mice.	
Do.	Jan. 11, 1888,			2 house mice.	
Do.	Jan. 14, 1888,	Fowl.			
Do.	Jan. 19, 1888,			5 meadow mice.	
Do.	Jan. 30, 1888,		Crow.		
Do.	Jan. 28, 1888,			Meadow mouse.	
Do.	Jan. 30, 1888,		Crow.	House mouse.	
Do.	Feb. 13, 1888,				Empty.
Do.	Feb. 18, 1888,				do.
Do.	Feb. 22, 1888,				do.
Chester county, Pa.,	May —, 1886,	Fowl,	Oriole,	Gray squirrel.	
Do.	Oct. 15, 1886,			House mouse.	
Do.	Nov. 22, 1886,			Meadow mouse.	
Do.	Nov. 16, 1886.	Fowl,		do.	
Do.	Dec. 4, 1886,				do
Do.	Dec. 8, 1886,				Offal.
Do.	Dec. 29, 1886,			4 meadow mice.	
Do.	Feb. 11, 1887.				Empty.
Do.	Feb. 16, 1887.				do
Do.	Dec. 11, 1886,		Sparrow.		
Do.	Jan. —, 1887,	Fowl.		Meadow mouse.	
Do.	Dec. 11, 1886,				do
Do.	Dec. —, 1886,			House mouse; meadow mouse.	
Do.	do.		Song sparrow.	2 meadow mice.	
Do.	Nov. —, 1886,		do.	Pine mouse.	
Do.	do.			do.	
Do.	Feb. 16, 1887,	Fowl.			
Do.	Dec. —, 1886,	do.		Meadow mouse; 2 house mice.	
Do.	Dec. 11, 1886.			7 house mice.	
Do.	Dec. 18, 1886,				Empty.
Do.	Apr. 20, 1886.			Mouse.	Beetles.
Do.	Dec. 28, 1886,			4 meadow mice.	
Do.	Nov. —, 1886.				Empty.
Do.	do.			Meadow mouse.	
Do.	do.			2 meadow mice.	
Do.	do.			3 meadow mice.	
Do.	do.			2 meadow mice.	
Do.	Dec. 28, 1886.			1 meadow mouse.	
Do.	do.			Meadow mice; rabbit.	
Do.	do.			5 meadow mice.	
Do.	Jan. 15, 1887,	Fowl.			
Do.	Nov. —, 1886,			2 house mice; 1 meadow mouse.	
Do.	do.			3 meadow mice.	
Do.	Jan. —, 1887,			2 meadow mice; mole.	
Do.	do.			Meadow mouse; rabbit; shrew.	

RED-TAILED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester county, Pa.,	Jan. —, 1887,			Meadow mouse; red squirrel.	
Do.	do.			3 meadow mice.	
Do.	Oct. —, 1886,			3 meadow mice; red squirrel.	
Do.	Dec. —, 1886,			4 meadow mice.	
Do.	do.			1 meadow mouse.	
Do.	Jan. —, 1887,		Feathers.	do.	
Do.	do.			Rabbit.	
Do.	do.		Feathers.		
Do.	Dec. —, 1886.			3 meadow mice.	
Do.	Oct. —, 1886.			Red squirrel.	
Do.	Dec. —, 1886,	Fowl.		House mouse,	Grasshopper
Do.	do.	do.			
Do.	Jan. 25, 1887,			House mouse.	
Do.	do.			Meadow mouse; white-footed mouse.	
Do.	Jan. 26, 1887,			Meadow mouse.	
Do.	do.			6 meadow mice.	
Do.	Dec. 31, 1886,			Mouse.	
Do.	Jan. 1, 1887,			White-footed mouse; shrew.	
Do.	Jan. 3, 1887,			Meadow mouse.	
Do.	Jan. 7, 1887.			Mouse.	
Do.	Jan. —, 1887,			Meadow mouse.	
Do.	do.			2 meadow mice,	Frog.
Do.	do.			2 meadow mice; shrew.	
Do.	do.			1 meadow mouse.	
Do.	do.			Meadow mouse.	
Do.	do.			do.	
Do.	do.			do.	
Do.	Jan. 18, 1887,		Meadowlark.		
Do.	Jan. 17, 1887,			House mouse.	
Do.	Jan. 22, 1887,			5 meadow mice.	
Do.	Nov. —, 1886.			Mouse.	
Do.	Dec. —, 1886,			Red squirrel.	
Do.	Nov. —, 1886,			Meadow mouse; red squirrel.	
Do.	do.			Meadow mouse.	
Do.	Jan. —, 1887,		Tree sparrow.		
Do.	do.				Empty.
Do.	do.		Crow.		
Do.	do.			Meadow mouse.	
Do.	do.			2 meadow mice; white-footed mouse.	
Do.	Feb. —, 1887,			Meadow mouse.	
Do.	do.			do.	
Do.	do.			6 meadow mice.	
Do.	do.			Meadow mouse; shrew.	
Do.	do.			3 meadow mice; 2 house mice.	
Do	do.				Offal.
Do.	Mar. 10, 1887,			Shrew.	
Do.	do.			Meadow mouse.	
Do.	do.			2 meadow mice.	
Do.	Feb. —, 1887,			7 Meadow mice.	
East Bradford, Pa.,	Feb. 4, 1879,			Mice.	
Westtown, Pa.,	Jan. 5, 1881,				Grasshoppers.
East Bradford, Pa.,	Feb. 15, 1879,			Mice.	
Do.	do.			do.	
Do.	do.			do.	
Willistown, Pa.,	Apr. 4, 1878,			do.	
Westtown, Pa.,	Mar. 11, 1879.			do.	
Pocopson, Pa.,	Nov. 25, 1878,	Quail.			
Willistown, Pa.,	Jan. 3, 1879,			Mice.	
West Bradford, Pa.,	Jan. 13, 1879,	Poultry.			
Kennett, Pa.,	Jan. 15, 1879,	do.			
Do.	do.			Mice.	
Willistown, Pa.,	Jan. 21, 1879,			do.	
Do.	do.			do.	Insects.
East Bradford, Pa.,	Mar. 24, 1879,			do.	do.
Do.	Dec. 25, 1883,			do.	
Chester county, Pa.,	Feb. 15, 1878,			do.	
Birmingham, Pa.,	Dec. 31, 1884,	Poultry.			
Willistown, Pa.,	Jan. 6, 1885,			Mice.	
Do.	do.			do.	
East Bradford, Pa.,	do.			do.	
Chester county, Pa.,	Jan. 5, 1881,				Grasshopper.
Willistown, Pa.,	Feb. 15, 1878,			Mice.	
Do.	Oct. —, 1876,		*	Rabbit.	
East Bradford, Pa.,	Aug. 15, 1876,		*		
Willistown, Pa.,	Apr. 8, 1877,	Poultry.		Mice.	
Do.	do.	do.			

RED-TAILED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Lancaster county, Pa..	Apr. 2, 1878.	. . . .	. . . . .	Mice.	
West Bradford, Pa., .	Nov. 25, 1879.	Quail.			
East Bradford, Pa.. .	Feb. 4, 1879.	. . . .	. . . . .	do.	
Caln, Pa., ...	Feb. 22, 1879.	. . . .	. . . . .	do.	
Do.	do.	. . . .	. . . . .	do.	
Westtown, Pa., ...	Jan. 23, 1879.	. . . .	. . . . .	do.	
Do.	do.	. . . .	. . . . .	do.	
East Bradford, Pa.. .	Jan. 20, 1879.	. . . .	. . . . .	do.	
Westtown, Pa..	Jan. 28, 1879.	. . . .	. . . . .	do.	
Do.	do.	. . . .	. . . . .	do.	
Do.	Jan. 20, 1879.	. . . .	. . . . .	do.	
Do.	do	. . . .	. . . . .	do.	
East Bradford, ...	Feb. —, 1879.	. . . .	. . . . .	do.	
Do.	do.	. . . .	. . . . .	do.	
Lancaster county, Pa..	Apr. 2, 1878.	. . . .	. . . . .	do.	
East Bradford, Pa... .	Feb. —, 1879.	. . . .	. . . . .	do.	
Westtown, Pa..	Jan. 28, 1879.	. . . .	. . . . .	do.	
Chester county, Pa.. .	do.	. . . .	. . . . .	. . . . .	Offal.
Pocopson, Pa., ...	Feb. 8, 1879.	. . . .	. . . . .	Mice.	
Caln, Pa., ...	Feb. 9, 1878.	. . . .	. . . . .	do.	
West Goshen, Pa., . .	Feb. 7, 1879.	. . . .	. . . . .	do.	
Westtown, Pa..	Jan. 29, 1879.	. . . .	. . . . .	do.	
Maryland, ...	Feb. —, 1879.	. . . .	. . . . .	Red squirrel; mice.	
East Bradford, Pa., .	Feb. 8, 1879.	. . . .	. . . . .	Mice.	
Willistown, Pa.. . . .	Jan. 21, 1879.	. . . .	. . . . .	do.	
West Whiteland, Pa.,	Mar. —, 1879.	. . . .	. . . . .	3 mice.	
Willistown, Pa., . . .	Jan. 13, 1879.	. . . .	. . . . .	Mice.	
Chester county, Pa.. .	Jan. 3, 1879.	Poultry.			
West Bradford, Pa.. .	Jan. 3, 1880.	do.			
Willistown, Pa.. . . .	Nov. 27, 1874.	. . . .	. . . . .	Red squirrel.	
East Bradford, Pa.. .	Dec. —, 1882.	. . . .	. . . . .	Red squirrel; mice.	
Willistown, Pa.. . . .	Jan. —, 1882.	. . . .	. . . . .	Rabbit.	
Westtown, Pa..	Jan. 5, 1881.	. . . .	. . . . .	Mice, ...	Grasshoppers and crickets.
Willistown, Pa.. . . .	Jan. 2, 1880.	. . . .	. . . . .	do.	Insects.
West Bradford, Pa.. .	Nov. 27, 1880.	. . . .	. . . . .	do.	
Willistown, Pa.. . . .	Mar. 27, 1880.	. . . .	. . . . .	do.	
Do.	Mar 22, 1880.	Quail.			
East Goshen, Pa.. . .	Mar. 20, 1880.	. . . .	. . . . .	Red squirrel; mice.	
Willistown, Pa.. . . .	do.	. . . .	. . . . .	Mice.	
Birmingham, Pa., . .	Feb. 26, 1880.	. . . .	. . . . .	do.	
Delaware county, Pa..	Feb 23, 1880.	. . . .	. . . . .	do.	
Do. . . .	do.	. . . .	. . . . .	do.	
Do. . . .	Jan. 30. 1880.	. . . .	. . . . .	do.	
Westtown, Pa., ...	Dec. 5. 1879.	. . . .	. . . . .	do.	
Chester county, Pa.. .	Dec. 3, 1879.	Poultry.			
Do. . . .	do.	. . . .	. . . . .	Mice.	
New Garden, Pa., . . .	Nov. 26, 1879.	. . . .	. . . . .	do.	
East Goshen, Pa.... .	Sept. 15, ——.	. . . .	. . . . .	do.	
Chester county, Pa., .	Dec. 10, 1877.	Poultry.			
Do. . . .	Oct. 3, 1880.	. . . .	. . . . .	Mice.	
Willistown, Pa.. . . .	Feb. —, 1876.	. . . .	Feathers.		
Do. . .	Jan. 20, 1876.	. . . .	. . . . .	Mice.	
Do. . .	Jan. —, 1876.	. . . .	. . . . .	do.	
Do. . .	Dec. 19, 1878.	. . . .	. . . . .	do.	
Do. . .	Jan. 18, 1875.	. . . .	. . . . .	do.	
Do. . .	Nov. 20, 1876.	. . . .	. . . . .	do.	
Do. . .	Mar. 26, 1876.	. . . .	. . . . .	do.	
Chester county, Pa.. .	Sept. —, 1874.	. . . .	. . . . .	Gray squirrel.	
West Goshen, Pa., . .	Dec. —, 1875.	. . . .	. . . . .	Mice.	
East Goshen, Pa.. . .	Feb. 19. 1875.	. . . .	. . . . .	. . . . .	Empty.
Dakota City, Neb., . .	July —, 1870.	Quail,	. . . . .	. . . . .	37 insects.
Elmira, N. Y., ...	June 1, 1886.	. . . .	. . . . .	Rat; red squirrel.	
Do. . . .	June 19, 1886.	Chicken			
Do. . . .	July 21, 1886.	. . . .	. . . . .	. . . . .	Grasshopper; beetles.
Do. . . .	Oct. 2, 1886,	. . . .	. . . . .	3 mice.	
Wellsburgh, N. Y.. . .	Apr. 7. 1887,	. . . .	. . . . .	Hair, ...	Beetles.
Halsey Valley, N. Y..	Aug. 10. 1887,	. . . .	. . . . .	2 mice, ...	Grasshoppers.
Sandy Spring, Md.. . .	Mar. 6. 1888.	. . . .	Tree sparrow.		
Do.	do.	. . . .	2 tree sparrows; 1 song sparrow.	Meadow mouse.	
Do. . .	Mar. 7. 1888,	. . . .	. . . . .	. . . . .	Empty.
Do. . .	do.	. . . .	. . . . .	. . . . .	do.
Do. . .	do.	. . . .	Song sparrow; junco.	Meadow mouse; rabbit.	
Do. . .	Mar. 9. 1888.	. . . .	. . . . .	Mole.	
Do. . .	Mar. 15. 1888,	. . . .	. . . . .	. . . . .	do.
Do. . .	do.	. . . .	Song sparrow. . .	Meadow mouse.	
Do. . .	do.	. . . .	. . . . .	2 house mice.	
Do. . .	Mar. 17. 1888.	. . . .	. . . . .	Shrew.	
Do. . .	do.	. . . .	. . . . .	Meadow mouse.	
Do. . .	Mar. 19. 1888.	. . . .	. . . . .	do.	
Gainsville, Fla	Jan. 4. 1888.	. . . .	. . . . .	2 cotton rats.	

23 BIRDS.

RED-TAILED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md.	Mar. 24, 1888,			1 pine mouse; 1 meadow mouse	
Chester county, Pa.	Feb. —, 1887,			3 meadow mice.	
Do.	Jan. —, 1887,			do.	
Do.	Apr. —, 1887,			2 meadow mice.	
Do.	Feb. —, 1887,			Meadow mice.	
Do.	do.			do.	
Do.	do.			do.	
Do.	do.			do.	
Sandy Spring, Md.	Mar. 28, 1888,				Toad, crawfish
Do.	Mar. 30, 1888,			2 meadow mice.	May beetle; other insects.
Do.	Apr. 18, 1888,				Empty.

Summary.—Of 311 stomachs examined, 29 contained poultry or game birds; 35, other birds; 203, mice 55, other mammals; 9, batrachians or reptiles; 24 insects; 3 crawfish; 4, offal, and 29 were empty. Two hundred and ten examined by the division contained 270 mice.

RED-SHOULDERED HAWK (*Buteo lineatus*).

Sing Sing, N. Y.	Oct. 3, 1885,		Flicker.		Toad; snake; cricket; larva.
Alfred Centre, N. Y.	Sept. 11, 1885,			Mouse.	Grasshopper; larva; spider.
Do.	Sept. 13, 1886,			4 shrews.	Grasshoppers; spider.
Do.	Sept. 12, 1886,				Grasshoppers.
Peterborough, N. Y.,	June 25, 1886,				Frogs: beetles.
Do.	do.			Redbacked mouse; 3 shrews.	
Do.	June 28, 1886,			Meadow mouse; 3 shrews.	Beetles; crawfish; spider.
Do.	do.			1 shrew.	
Do.	July 28, 1886,				Insects.
Oneida Lake, N. Y.,	Aug. 30, 1886,				Squash bug.
Morrisville, N. Y.	Sept. 6, 1886,			Meadow mouse; 1 shrew.	10 grasshoppers
Birmingham, Pa.	Mar. 15, 1886,		Feathers.		
Chester county, Pa.	Jan. 3, 1886,				Cricket; larvæ; 2 spiders.
East Hartford, Conn.,	Dec. 14, 1886,			Meadow mouse.	Frog.
Gainesville, Florida,	Feb. 28, 1887,				do.
Do.	Mar. 17, 1887,				Frog; dragon flies.
Do.	April 7, 1887,				Lizard; 2 crickets; larvæ of beetles.
Do.	April 11, 1887,				Snake; insects; earth worm.
Greensborough, Ala.	Nov. 19, 1887,				Grasshopper: crickets.
East Hartford, Conn.,	April 5, 1887,			Shrew.	Garter snake; bull-frog.
Do.	July 5, 1887,			Meadow mouse.	Beetle; wasp; larvæ.
Portland, Conn.	Oct. 29, 1887,				Leopard frog.
Washington, D. C.	Dec. 24, 1887,			House mouse; 2 meadow mice.	Crawfish.
Do.	do.			Meadow mouse; shrew.	Frog; grasshoppers.
Do.	Jan. 22, 1888,				Empty.
Greensborough, Ala.	Feb. 16, 1888,				Grasshoppers; beetles.
Locust Grove, N. Y.	Aug 24, 1876,				Grasshoppers.
Sing Sing, N. Y.	April 8, 1880,			Mouse.	
Do.	May 6, 1880,			Meadow mouse; shrew.	2 toads; grasshopper.
Do.	Sept. 19, 1882,				Toad; larvæ.
Do.	Feb. 2, 1884,			2 shrews.	Frog; salamander.
Do.	Feb. 14, 1885,			Mole.	
Do.	April 2, 1885,			Meadow mouse; shrew.	
Portland, Conn.	Oct. 18, 1886,			Mice.	
East Hartford, Conn.	Oct. 29, 1886,			Mole.	
Sandy Spring, Md.,	Jan. 8, 1887,			House mouse.	
Do.	do.			2 house mice; white-footed mouse; 1 meadow mouse.	
Do.	Jan. 28, 1887,			4 meadow mice.	

1. Barred Owl. 2. Saw-whet Owl.
Females.

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CALIFORNIA

RED-SHOULDERED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md.	Feb. 11, 1887,			Pine mouse; meadow mouse; shrew.	Tree-frog; beetle; spider.
Do.	Mar. 8, 1887,			House mouse.	
Do.	do.			Mouse	
Do.	do.			2 meadow mice.	
Do.	Mar. 24, 1887,		Screech owl,	Meadow mouse,	
Do.	Nov. 26, 1887,				Grasshoppers; beetles; spider.
Do.	Dec. 3, 1887,			Meadow mouse.	Grasshopper.
Do.	do.			Pine mouse.	
Do.	Dec. 9, 1887,			Meadow mouse.	
Do.	Dec. 27, 1887,			4 meadow mice.	
Do.	Jan. 30, 1888,			1 mole.	
Do.	do.		Field sparrow.		
Do.	do.		Carolina dove,	Meadow mouse.	
Chester county, Pa.,	Nov. 23, 1886,			2 meadow mice,	Grasshopper.
Do.	Jan. 20, 1886,				Insects.
Do.	April 3, 1886,			Opossum,	Crickets; larvæ.
Do.	Nov. 29, 1886,			Mouse.	
Do.	Dec. 1, 1886,			Meadow mouse.	
Do.	Dec. 2, 1886,			do.	
Do.	Dec. 15, 1886,			Shrew.	
Do.	Dec. 16, 1886,			Meadow mouse.	
Do.	Jan. 21, 1886,			5 meadow mice.	
Do.	Jan. 26, 1887,			do.	
Do.	Jan. 28, 1887,			Mouse.	
Do.	Jan. —, 1887,			do.	
Do.	do.			do.	
Do.	Dec. 18, 1886,			Meadow mouse; rabbit.	
Do.	Dec. 20, 1886,			Meadow mouse.	Larvæ; offal.
Do.	Jan. 18, 1887,			do.	
Do.	do.				Empty.
Do.	Jan. —, 1887,			Meadow mouse.	
Do.	Feb. —, 1887,			3 meadow mice.	
Willistown, Pa.,	Feb. 20, 1881,			Mice.	
Do.	Mar. 3, 1881,			Rabbit.	
Pennsylvania,	Dec. 25, 1879,			Mice.	Grasshoppers.
West Chester, Pa.,	Dec. 9, 1879,			do.	do.
West Pikeland, Pa.,	do.				do.
Westtown, Pa.,	Feb. 4, 1878,			*	do.
Do.	Feb. 4, 1879,			*	do.
Willistown, Pa.,	Jan. 21, 1879,				Empty.
Volusia county, Fla.,	Mar. 18, 1886,				Catfish.
Saint John's river, Fla.,	Mar. 14, 1886,			*	Insects.
Milltown, Pa.,	Dec. 29, 1884,			Mice.	
Thornbury, Pa.,	Jan. 8, 1885,			do.	Insects.
Westtown, Pa.,	Jan. 10, 1879,			do.	
Do.	Jan. 28, 1879,			do.	
Do.	Feb. 20, 1879,			do.	
Do	Jan. 27, 1879,			do.	Insects.
Do.	Feb. 4, 1879,			do.	
Do.	Feb. —, 1879,			do.	
Do.	Feb. —, 1879,			do.	
Willistown, Pa.,	April 3, 1877,			do.	
Chester county, Pa.,	Nov. 30, 1879,				Insects.
Pennsylvania,	Jan. 5, 1881,			Mice.	
Barton, N. Y.,	Jan. 1, 1886,			3 mice.	
Elmira, N. Y.,	Jan. 21, 1886.	Chicken.			
Do.	April 5, 1886,			Field mice.	
Do.	Aug. 13, 1887,			Skunk.	
Big Flats, N. Y.,	Sept. 5, 1887,				Grasshoppers; beetles.
Corning, N. Y.,	Sept. 23, 1887,			Field mice,	Insects.
Greensborough, Ala.,	Feb. 25, 1888.			Mouse,	Lizard; grasshopper; cockroach; 3 crawfish.
Sandy Spring, Md.	Mar. 17, 1888.			Meadow mouse.	
Gainsville, Fla.,	Jan. 4, 1888.				Spider.
Do,	Jan. 18, 1888,				4 mole crickets; 20 larvæ.

Summary.—Of 102 stomachs examined, 1 contained poultry; 5, other birds; 61, mice; 20 other mammals; 15, reptiles or batrachians; 40, insects; 7, spiders; 3, crawfish; 1, earth worm; 1, offal; 1 catfish and 3 were empty.

SWAINSON' HAWK (*Buteo swainsoni*).

LOCALITY.	DATE.	Poultry or game birds.	Other birds.	Mammals	Miscellaneous.
Cedar county, Neb..	Aug. —, 1867.			Gopher.	68 locusts.
Do.	do.			do.	61 locusts.
Dakota county, Neb..	July —, 1868.			Rabbit.	58 insects.
Sarpy county, Neb..	Sept. —, 1872.			Gopher; mouse.	65 insects.

Summary.—Of 4 stomachs examined each one contained small mammals and insects.

BROAD-WINGED HAWK (*Buteo latissimus*).

Sing Sing, N. Y..	Sept. 19, 1885.			Chipmunk.	Crickets; grasshoppers.
Middle Haddam, Conn.	Sept. 4, 1885.				Toad.
London, Canada.	Sept. 22, 1883.				Toad; large number larvæ
Lockport, N. Y..	April 27, 1886.			Meadow mouse.	Snake; 2 beetles.
Brooklyn, Ohio.	May 10, 1886.			Chipmunk; shrew.	
Washington, D. C..	June 5, 1887.		3 ovenbirds.	2 shrews.	
Syracuse, N. Y..	April 30, 1886.				Toad.
Roane mountain, N. C..	Aug. 10, 1887.			Mouse.	
Long Island City, N. Y..	Sept. 23, 1887.				Garter snake; toad; larvæ; beetles.
Do.	Sept. 24, 1887.				Larvæ.
Do.	do.				Quantity of crickets.
Sing Sing, N. Y..	Sept. 21, 1881.				8 elm sphinx larvæ.
Do.	Sept. 23, 1881.				Elm sphnix larvæ.
Lake George, N. Y..	Aug. 2, 1882.				Garter snake.
Sing Sing, N. Y..	May 8, 1885.				Quantity of earth worms.
Troy, N. Y..	Sept. 19, 1885.				Tree-frog; grasshoppers.
Sandy Spring, Md..	May 10, 1887.			Chipmunk; shrew.	
Do.	Sept. 1, 1887.				Grasshopper.
Chester county, Pa..	May 28, 1878.				Frog.
Elmira, N. Y..	June 27, 1885.			Large rat; field mouse.	
Do.	April 9, 1886.			Weasel.	
Do.	July 3, 1887.		Small bird.		

Summary.—Of 22 stomachs examined, 2 contained small birds; 3, mice; 5, other mammals; 8 reptiles or batrachians; 10, insects, and 1, earth worms.

ROUGH-LEGGED HAWK (*Archibuteo lagopus sancti-johannis*).

Chester county, Pa..	Dec. 9, 1886.		Shrew.	
Northampton, Mass..	Feb. 23, 1887.		2 meadow mice.	
Do.	Feb. 16, 1887.		7 meadow mice.	
South Windsor, Conn..	Mar. 29, 1887.		Meadow mouse.	
Portland, Conn..	Mar. 30, 1887.		6 meadow mice.	
Northampton, Mass..	Nov. 30, 1887.		5 meadow mice.	
Do.	Dec. 2, 1887.		Meadow mouse; house mouse.	
Do.	Dec. 14, 1887.		6 meadow mice.	
Do.	Dec. 20, 1887.		3 house mice.	
Do.	Nov. 26, 1886.		Meadow mice.	
Do.	Nov. 27, 1886.		do.	
Do.	Dec. —, 1886.		do.	
Chester county, Pa..	Feb. — 1887.		Meadow mouse.	
Do.	Jan. 28, 1879.		Mice.	
Do.	do.		do.	
Do.	Dec. 27, 1878.		do.	
Do.	April —, 1876.		do.	
Do.	Mar. 20, 1880.		do.	
Beatrice, Nebr..	Sept. —, 1872.		Gopher.	Lizard; 70 insects.
Elmira, N. Y..	Nov. 5, 1887.		Rabbit.	
Do.	Jan. 3, 1888.		Weasel.	
Sandy Spring, Md..	Mar. 17, 1888.		2 meadow mice.	
Northampton, Mass..	April 9, 1888.		do.	

ROUGH-LEGGED HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Northampton, Mass.,	April 14, 1888,	.....	.....	8 meadow mice.	
Do.	do.	.....	.....	2 meadow mice.	
Do.	April 15, 1888.	.....	.....	.....	Empty.
Do.	do.	.....	.....	2 meadow mice.	
Do.	do.	.....	.....	3 meadow mice.	

Summary.—Of 28 stomachs examined, 23 contained mice; 4, other mammals; 1, lizard; 1, insects; 1 was empty. Seventeen stomachs examined by the division contained 52 mice.

GOLDEN EAGLE (*Aquila chrysaëtos*).

Gaithersburgh, Md.,	Dec. 8, 1887.	.....	.....	.....	Carrion.

Summary.—The stomach examined contained carrion.

BALD EAGLE (*Haliæetus leucocephalus*).

Sandy Spring, Md.,	Jan. 28, 1887.	.....	.....	.....	Carrion.
Oneida Lake, N. Y.,	Aug. 30, 1886.	.....	.....	.....	Sunfish.
Do.	do.	.....	.....	.....	Fish.
Sing Sing, N. Y.,	Feb. 27, 1881.	.....	.....	.....	Goldfish.
Paint Rock, Tex.,	Jan. 28, 1887.	.....	.....	2 prarie dogs.	
Gainesville, Fla.,	Jan. 13, 1888,	.....	.....	.....	Fish and offal.

Summary.—Of 6 stomachs examined, 1 contained mammals; 2, carrion; 4, fish.

PRAIRIE FALCON (*Falco mexicanus*).

Sarpy county, Neb.,	Sept. —, 1874,	.....	Prairie hen,	.....	16 locusts.

Summary.—The 1 stomach examined contained a game bird and insects.

DUCK HAWK (*Falco peregrinus anatum*).

Portland, Conn.,	April 29, 1886.	Duck.	.....	.....	Beetles.
East Bradford, Pa.,	Feb. 14, 1886.	.....	Feathers.		
Do.	Mar. 27, 1880.	Fowl.			
Watkins, N. Y.,	Oct. 28, 1887.	.....	Meadow lark.		
Elmira, N. Y.,	Dec. 3, 1887.	.....	.....	2 mice.	

Summary.—Of 5 stomachs examined, 2 contained poultry and remains of game bird; 2, remains of other birds; 1, mice; 1, insects.

PIGEON HAWK (*Falco columbarius*).

Shelter Island, N. Y.,	Sept. 11, 1886,	.....	Small bird.		
Portland, Conn.,	May 6, 1886.	.....	Swift.		
Lockport, N. Y.,	May 14, 1886.	.....	Song sparrow.		
Rockville, Conn.,	Sept. 20, 1886.	.....	.....	.....	25 crickets; 6 grasshoppers.
Long Island City, N. Y.,	May 3, 1886.	.....	English sparrow.		
Sayville, N. Y.,	Sept. 14, 1887.	.....	.....	.....	Dragon flies; other insects.
East Hartford, Conn.,	Sept. 10, 1887.	.....	Small bird.		
Sing Sing, N. Y.,	May 3, 1880.	.....	Feathers.		
East Hartford, Conn.,	Sept. 24, 1886.	.....	Indigo bird.		
West Chester, Pa.,	Feb. 20, 1878,	.....	Feathers.		
Barton, N. Y.,	Aug. 2, 1886.	.....	Flicker.		
Do.	do.	.....	.....	Field mice.	Insects
Do.	Aug. 3, 1886.	.....	.....	do.	do.

PIGEON HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Elmira, N. Y.	June 4, 1886,		English sparrow.		
Do.	do.		do.		
Do	July 3, 1885,				Grasshoppers; small beetles.
Horseheads, N. Y.	Aug. 14, 1885,				Small insects.
Elmira, N. Y.,	Aug. 29, 1885,				Grasshoppers; beetles.
Gainesville, Fla.	Jan. 4. 1888,		Field sparrow; warbler.		

Summary.—Of 19 stomachs examined, 12 contained small birds; 2, mice; 7, insects.

SPARROW HAWK (*Falco sparverius*).

Locust Grove, N. Y.	Aug. 18, 1885,				Spider; grasshoppers.
Sing Sing, N. Y.,	Sept. 22, 1885,				Insect remains.
Washington, D. C.,	Nov. 3, 1885,				Grasshoppers; crickets.
Alfred Centre, N. Y.,	Sept. 4, 1885,				Larvæ.
Volusia county, Fla.	Mar. 1, 1885,				Lizard.
Do.	April 4, 1885,				2 lizards; insect remains.
Petersborough, N. Y.,	July 13, 1886,			Hair of mice.	
Do.	July 24, 1886,				Grasshoppers; crickets.
Do.	July 24, 1886,		Sparrow.		Crickets.
Chester county, Pa.	July 28, 1886,				Grasshopper and crickets.
Do.	do.				Grasshoppers and crickets.
Do.	Feb. 24, 1886,				Larvæ.
East Windsor Hill, Ct.	Feb. 4, 1886,				Empty.
Maplewood, N. J.,	Jan 16, 1886,		Song sparrow.		
Do.	May 25, 1886,		Vireo.		
Lockport, N. Y.,	Aug. 31, 1886,				30 crickets.
Avon, Ohio,	July 5, 1886,				Remains of insects.
Baddeck, Nova Scotia,	Aug. 13, 1886.				Grasshoppers.
Gainesville, Fla.	April 20, 1887,				Lizard; beetle; larvæ.
Harwood, Dak.,	July 13, 1887,			Mouse.	
Long Island City, N. Y.,	Sept. 16, 1887,				Grasshoppers and crickets.
East Hartford, Conn.,	Sept. 9, 1887.				Grasshoppers and crickets.
Portland, Conn.,	April 12, 1887.			Meadow mouse.	Remains of insects.
Devil's Lake, Dak.,	Aug. 13, 1887.				Snake; grasshoppers; crickets; larvæ.
Bottineau, Dak.	Aug. 27, 1887,				Cricket.
Washington, D. C.,	Dec. 24, 1887.			House mouse.	Grasshoppers; beetles.
Do.	do.				Grasshoppers.
Do.	Dec. 25, 1887.			House mouse.	6 grasshoppers.
Do.	Dec. 27, 1887,		English sparrow,		Grasshoppers.
Sing Sing, N. Y.,	April 10, 1880,				do.
Do	Jan. 29, 1883,			Meadow mouse,	
Do.	Jan. 14, 1885,			do.	
East Hartford, Conn.,	Sept. 18, 1886.		Song sparrow.		
Do.	July 16, 1886,		Sparrow,		do.
Do.	Oct. 13, 1886,			Meadow mouse,	do.
Sandy Spring, Md.,	Jan. 28, 1887,			do.	
Do.	Mar. 2, 1887,			House mouse,	Grasshopper.
Do.	do.			Mouse hair.	
Do.	do.			House mouse,	Remains of insects.
Do.	do.			Meadow mouse,	Remains of insects.
Do.	do.			White-footed mouse; house mouse.	
Do.	do.		Song sparrow.		
Do.	do.				Remains of insects.
Do.	Mar. 8, 1887,		Song sparrow,		15 crickets.
Do.	Mar. 12, 1887,				Grasshoppers; crickets; caterpillars; beetles.

Snowy Owl.

SPARROW HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Sandy Spring, Md.	Mar. 18, 1887.	.....	Vesper sparrow.	.....	Larva.
Do.	do.	.....	.....	Meadow mouse.	Cricket; beetles
Do.	Mar. 24, 1887.	.....	.....	House mouse.	Cricket; larvæ.
Do.	do.	.....	.....	.....	Empty.
Do.	April 1, 1887.	.....	.....	Meadow mouse.	
Do.	April 8, 1887.	.....	.....	.....	do.
Do.	do.	.....	.....	Meadow mouse.	Crickets; beetles; spider.
Do.	April 28, 1887.	.....	.....	Mouse.	Spider.
Do.	May 13, 1887.	.....	.....	Meadow mouse.	Grasshoppers; white grubs.
Do.	June 23, 1887.	.....	.....	.....	Grasshoppers and crickets.
Do.	Sept. 26, 1887.	.....	.....	.....	Grasshoppers; spider.
Do.	Oct. 28, 1887.	.....	.....	.....	Grasshoppers; crickets; spider.
Do.	Jan. 2, 1888.	.....	.....	Shrew.	Grasshopper.
Do.	Feb. 22, 1888.	.....	.....	Meadow mouse.	
Do.	Nov. 26, 1887.	.....	.....	.....	Grasshoppers, etc.
Chester county, Pa.	April 3, 1886.	.....	.....	Meadow mouse.	Caterpillars.
Do.	Dec. 29, 1886.	.....	.....	Mouse.	
Do.	Dec. 28, 1886.	.....	.....	Meadow mouse.	Crickets; grasshoppers.
Do.	Dec. 29, 1886.	.....	Sparrow.		
Do.	Jan. 17, 1886.	.....	Song sparrow.	White-footed mouse.	
Do.	Feb. 8, 1886.	.....	Tree sparrow.	White-footed mouse.	
Do.	Dec. 1, 1886.	.....	.....	Meadow mouse.	Grasshoppers; cricket; larvæ
Do.	Dec. 3, 1886.	.....	.....	.....	Beetle.
Do.	Dec. 9, 1886.	.....	Junco.		
Do.	do.	.....	Feathers.	Meadow mouse; 2 shrews.	
Do.	Dec. 16, 1886.	.....	do.		
Do.	Nov. 26, 1886.	.....	.....	Meadow mouse.	Crickets.
Do.	Feb. 7, 1887.	.....	.....	do.	Crickets; caterpillars; spider
Do.	Jan. 12, 1887.	.....	Tree sparrow.		
Do.	Mar. 10, 1886.	.....	.....	.....	Empty.
Do.	Jan. 6, 1885.	.....	.....	.....	Caterpillars; spider.
Do.	Mar. 15, 1886.	.....	.....	.....	Empty.
Do.	.....	.....	.....	Meadow mouse.	Grasshoppers; larvæ.
Do.	Jan. —, 1887.	.....	.....	do.	
Do.	do.	.....	.....	.....	8 larvæ; spider.
Do.	Dec. 20, 1886.	.....	.....	Meadow mouse.	Larva.
Do.	Jan. 10, 1887.	.....	Song sparrow.		
Do.	Feb. 9, 1886.	.....	.....	.....	Grasshoppers; beetles; larvæ
Do.	.....	.....	.....	.....	Remains of insects.
Do.	.....	.....	.....	Meadow mouse.	
Do.	Jan. —, 1887.	.....	.....	House mouse.	Grasshoppers; 10 larvæ.
Do.	.....	.....	.....	Meadow mouse.	Grasshopper; larvæ; beetle.
Do.	Jan. 25, 1887.	.....	.....	House mouse.	Crickets; larvæ.
Do.	do.	.....	.....	Meadow mouse.	5 grasshoppers; 5 larvæ; spider.
Do.	do.	.....	.....	do.	
Do.	Jan. 27, 1887.	.....	Tree sparrow.	do.	
Do.	Jan. —, 1887.	.....	.....	do.	
Do.	Feb. 1, 1887.	.....	.....	White-footed mouse.	Caterpillar; crickets; spider.
Do.	do.	.....	.....	2 meadow mice.	
Do.	do.	.....	.....	.....	6 caterpillars; 6 grasshoppers; spider.
Do.	Nov. 29, 1886.	.....	.....	.....	Insects.
Do.	July 3, 1886.	.....	.....	.....	do.
Do.	Dec. 30, 1879.	.....	Meadow lark.		
Do.	Dec. 16, 1879.	.....	Junco.	Mice.	
Drayton Island, Fla.	Feb. 20, 1885.	.....	Feather.	.....	do.
Goshen, Pa.	Jan. 12, 1881.	.....	.....	Mice.	
West Chester, Pa.	Oct. 27, 1880.	.....	.....	.....	do.
Chester county Pa.	Dec. 23, 1880.	.....	Meadow lark.	.....	do.
Do.	Jan. 12, 1881.	.....	.....	Mice.	
Do.	Jan. 17, 1881.	.....	.....	do.	
Do.	Sept. 24, 1880.	.....	.....	.....	Grasshopper.

SPARROW HAWK—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester county, Pa.	Feb. 16, 1880,			Mice.	
Delaware county, Pa.	Jan. 30, 1880,			do.	
Chester county, Pa.	Jan. 14, 1881,			do.	
East Bradford, Pa.	Jan. 1, 1880,				Insects.
Chester county, Pa.	Nov. 20, 1879,				do.
Do.	Aug. 25, 1876,			Mice.	
Do.	July —, 1870,			Bat.	
Do.	Jan. 16, 1879,		Junco,	Mice.	
Dixon county, Neb.	July —, 1865,			Mouse,	8 locusts; 27 other insects.
Dakota county, Neb.	do.			Gopher,	38 insects.
Do.	June —, 1866,	Quail,			29 insects.
Do.	July —, 1866,				34 insects.
Do.	Aug. —, 1867,			Rabbit,	22 insects.
Cedar county, Neb.	do.			Mice,	47 locusts.
Pierce county, Neb.	July —, 1869,			Gopher,	40 insects.
Sarpy county, Neb.	Sept. —, 1871,			Mice,	37 insects.
Do.	June —, 1872,		Birds.		43 insects.
Lancaster county, Neb.	Sept. —, 1873.				40 insects; frogs
Hale county, Ala.	Mar. 17, 1888.				Grasshoppers; crickets.
Gainesville, Fla.	Jan. 4, 1888,				Remains of insects.
Do.	Jan. 9, 1888,				Larvæ and other insects.
Los Gatos, Cal.	Dec. 7, 1887,		Sparrow.		
Do.	Dec. —, 1887,				Crickets.
Do.	Jan. 19, 1885.		Warbler.		
Do.	Dec. 31, 1887,		Meadow lark; sparrow.		
Sandy Spring, Md.	Apr. 2, 1888,		Field sparrow,		White grub; beeties, spider
Chester county, Pa.	Feb. 7, 1887,				Caterpillar.

Summary.—Of the 133 stomachs examined, 1 contained game bird; 28, other birds; 55, mice; 6, other mammals; 5, reptiles or batrachians; 83, insects; 12, spiders, and 5 were empty.

BARN OWL (*Strix pratincola*).

Chickemauga, Tenn.	Nov. 27, 1885,		Cowbird; sparrow.		
Chester county, Pa.	May 21, 1886,			Meadow mice.	
Do.	Dec. 8, 1886,	Pigeon.			
Dixon county, Neb.	Aug. —, 1867,			Mouse,	39 locusts; 22 other insects.
Dakota county, Neb.	July —, 1868,				55 insects.
Lancaster county, Neb.	June —, 1872,			Mouse,	40 insects.
Gainesville, Fla.	Feb. 4, 1887,			2 cotton rats; 2 shrews.	

Summary.—Of 7 stomachs examined, 1 contained poultry; 1, other birds; 4, mice; 1, other mammals; 3, insects.

LONG-EARED OWL (*Asio wilsonianus*).

Cohuila Valley, Cal.	Apr. 1, 1886,			2 pocket mice.	
Washington, D. C.	Mar. 27, 1887,		Song Sparrow,	Meadow mouse.	
Sheepshead Bay, L. I., N. Y.	Nov. 2, 1886.		Junco; kinglet,	do.	
Washington, D. C.	Mar. 16, 1887,				Empty.
Sandy Spring, Md.	Mar. 8, 1887,				do.
Do.	Mar. 12, 1887,			Meadow mouse.	
Do.	Mar. 18, 1887,				do.
Do.	Nov. 19, 1887,				do.
Do.	Jan. 7, 1888,			2 meadow mice,	
Chester county, Pa.	Jan. 11, 1887,			Meadow mouse; 3 house mice.	
Do.	Nov. 20, 1886,			Meadow mouse.	
Do.	Dec. 11, 1886,			do.	
Do.	Jan. 28, 1887,			2 meadow mice.	
Do.	do.			White-footed mouse; meadow mouse.	
Do.				Meadow mouse.	

1. Yellow-billed Cuckoo. *2. Black-billed Cuckoo.*

Males.

UNIV. OF
CALIFORNIA

LONG-EARED OWL—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester county, Pa.,	Dec. 13, 1886,	.....	.....	White-footed mouse; 2 meadow mice; shrew.	
Woodstock, Conn.,	June —, 1887,	.....	.....	4 meadow mice.	
Boston, Mass.,	Oct. 13, 1887,	.....	Sparrow; warbler.	Meadow mouse.	
Montgomery co., Pa.,	Dec. 26, 1887,	.....	.....	do.	
Sing Sing, N. Y.,	Apr. 29, 1880,	.....	Goldfinch; 2 sparrows.	Mouse.	
Do.	do.	.....	.....	2 mice.	
Do.	do.	.....	Small bird,	do.	
Chester county, Pa.,	Nov. 25, 1886,	.....	.....	Mice.	
Do.	Nov. 10, 1878,	.....	.....	do.	
Do.	Dec. 30, 1884,	.....	.....	do.	
Westtown, Pa.,	Feb. 23, 1879	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Chester county, Pa.,	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	Nov. 22, 1880,	.....	.....	do.	
Do.	Dec. 5, 1879,	.....	.....	do.	
Do.	Feb. 25, 1880,	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Do.	do.	.....	.....	do.	
Dakota county, Neb.,	July —, 1865,	.....	.....	Rabbit,	Few insects.
Elmira, N. Y.,	Aug. 5, 1885,	.....	.....	Field mice.	
Do.	Aug. 12, 1885,	.....	.....	do.	
Do.	Oct. 13, 1886,	.....	.....	do.	
Do.	do.	.....	.....	do.	
Nichols, N. Y.,	July 4, 1887,	.....	.....	.....	Empty.
Tioga, Pa.,	Sept. 2, 1887,	.....	.....	Field mice.	
Elmira, N. Y.,	Dec. 21, 1887,	Quail.			

Summary.—Of 47 stomachs examined, 1 contained a game bird; 5, other birds; 40, mice; 2, other animals; 1, insects, and 5 were empty.

SHORT-EARED OWL (*Asio accipitrinus*).

Washington, D, C.,	Nov. 22, 1886,	.....	2 juncos; 1 fox sparrow.		
Oakdale, N. Y.,	Nov. 27, 1886,	.....	.....	Mouse.	
Rockville, Conn.,	Oct. 22, 1886,	.....	.....	2 meadow mice.	
Do.	do.	.....	.....	Mouse hair.	
Koshkonong, Wis.,	Sept. 25, 1886.	.....	.....	Meadow mouse.	
Washington, D. C.,	Apr. 20, 1887,	.....	.....	3 meadow mice.	
Hillsborough, New Brunswick.	Sept. 3, 1887,	.....	.....	2 meadow mice.	
Washington, D. C.,	Jan. —, 1887,	.....	.....	1 meadow mouse.	
Do.	Mar. 28, 1887,	.....	Robin.		
Hackensack, N. J.,	Mar. 31, 1887,	.....	.....	2 meadow mice; 1 shrew.	
South Windsor, Conn.,	Mar. 29, 1887.	.....	Sparrow,	2 meadow mice.	
Do.	do.	.....	.....	do.	
Do.	Nov. 4, 1887,	.....	.....	do.	
Do.	do.	.....	.....	5 meadow mice.	
Do.	do.	.....	.....	4 meadow mice.	
Washington, D. C.,	Jan. 23, 1888,	.....	.....	1 meadow mouse.	
Glastonbury, Conn.,	Nov. 23, 1886,	.....	.....	.....	Empty.
Do.	do.	.....	.....	.....	do.
East Hartford, Conn.,	Nov. 11 1886,	.....	.....	4 meadow mice.	
Do.	Nov. 2, 1886,	.....	.....	3 meadow mice.	
Sandy Springs, Md.,	Jan. 28, 1887,	.....	.....	Meadow mouse.	
Do.	Mar. 5, 1887,	.....	.....	Mouse.	
Do.	do.	.....	.....	.....	do.
Do.	do.	.....	.....	.....	do.
Do.	do.	.....	.....	Mouse.	
Do.	Jan. 7, 1888,	.....	.....	2 meadow mice.	
Do.	Feb. 13, 1888,	.....	.....	.....	do.
Chester county, Pa.,	Jan. 25, 1887,	.....	.....	Meadow mouse.	
Do.	Dec. 21, 1886,	.....	.....	do.	
Do.	Dec. 10, 1886,	.....	.....	Pine mouse.	
Do.	Nov. 20, 1886,	.....	.....	3 meadow mice.	
Do.	Nov. 25, 1886,	.....	.....	1 meadow mouse.	
Do.	Nov. 27, 1886,	.....	Feathers.		
Do.	Dec. 8, 1886,	.....	.....	Meadow mouse.	
Do.	Mar. 5, 1887,	.....	.....	.....	do.
Do.	.....	.....	.....	Mice.	

SHORT-EARED OWL—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester county, Pa.,	Jan. 4, 1880.			Mice.	
Do.	Jan. 5, 1880.			do.	
Dakota county, Neb.,	July —, 1870.			Rabbit,	17 insects.
Lincoln, Neb.,	Sept. —, 1868.			Gopher,	30 locusts.
Elmira, N. Y.,	Aug. 13, 1884.			Field mice.	Beetle.
Do.	Aug. 3, 1886.			do.	do.
Do.	Aug. 7, 1886.			do.	do.
Erin, N. Y.,	Oct. 5, 1887.			do.	do.
Do.	Dec. 29, 1887.			do.	do.

Summary.—Of 45 stomachs examined, 4 contained small birds; 34, mice; 3, other mammals, 7, insects, and 6 were empty.

BARRED OWL (*Syrnium nebulosum*).

Englewood, N. J.,	Feb. 22, 1886.			Meadow mouse.	
Alfred Centre, N. Y.,	Oct. 22, 1886.			Red squirrel.	
Whitewater, Wis.,	Aug. 30, 1886.				Empty.
Washington, D. C.,	Feb. 15, 1887.				do.
Do.	Mar. 16, 1887.			Shrew,	Frog; 8 larvæ.
Greensborough, Ala.,	Nov. 15, 1887.				Spider; grasshoppers; crickets.
Moose River, N. Y.,	June 10, 1878.			12 red-backed mice.	
Sing Sing, N. Y.,	Nov 27, 1882.	Fowl.			
Do.	Jan. 21, 1885.			2 meadow mice.	
Do.	Mar. 21, 1885.		Saw-whet owl.		
Saint Louis, Mo.,	Spring, 1885.		Screech owl.		
Eubanks, Ky.,	Mar. 21, 1887.			Meadow mice; rabbit.	
Greensborough, Ala.,	Nov. 12, 1887.				Empty.
Sand Spring, Md.,	Apr. 25, 1887.				Crawfish.
Do.	Nov. 14, 1887.			4 meadow mice.	
Do.	Nov. 28, 1887.		Screech owl.		
Do.	Feb. 11, 1888.				Empty.
Do.	Feb. 18, 1888.			Meadow mice.	
Do.	Feb. 19, 1888.			Rabbit.	
Chester county, Pa.,	Dec. 10, 1886.			Flying squirrel.	
Do.	Dec. 16, 1886.			Rabbit.	
Do.				Mice.	
Do.	Jan. —, 1880.			do.	
	Jan. 17 1881.			do.	
Elmira, N. Y.,	Aug. 1, 1885.				Frog; crawfish.
Do.	Aug. 7, 1886.			Several mice.	
Waverly, N. Y.,	Sept. 4, 1887.			Mice,	Insects.
Barton, N. Y.,	Oct. 17, 1886.			Field mice.	
Halsey Valley, N. Y.,	Oct. 5, 1887.				Fish; insects.
Elmira, N. Y.,	Nov. 4, 1884.			Mice.	
Tyrone, N. Y.,	Nov. 13, 1887.				Empty.
Elmira, N. Y.,	Dec. 1, 1886.			Weasel.	
Caton, N. Y.,	Jan. 1, 1885.			Mice.	
Tioga, N. Y.,	Feb. 9, 1886.			Field mouse; mole.	
Elmira, N. Y.,	Feb. 19, 1887.		Small birds.		
Do.	Mar. 3, 1886.			Field mice.	
Alexandria, Va.,	Apr. 17, 1888.				do.

Summary.—Of 37 stomachs examined, 1 contained poultry; 4, other birds; 16, mice; 8, other mammals; 2, frogs; 4, insects; 1, spider; 2, crawfish; 1, fish, and 6 were empty.

FLORIDA BARRED OWL (*Syrnium nebulosum alleni*).

Gainesville, Fla.,	Apr. 20, 1887.				Frog; crawfish; grasshoppers; larvæ; beetle.
Do.	May 9, 1887.				Lizard.
Do.	Dec. 29, 1887.			Mouse.	
Do.	Feb. 19, 1888.			do.	

Summary.—Of 4 stomachs examined, 2 contained mice; 2, batrachian and reptile; 1, insects; 1, crawfish.

SAW-WHET OWL (*Nyctala acadica*).

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Taunton, Mass.	Dec. 11, 1885.			Mouse hair.	
East Hartford, Conn.	Jan. 7, 1887.			White-footed mouse.	
Hillsborough, N. B.	Oct. 21, 1886.			Mouse hair.	
Flatbush, N. Y.	Nov. 3, 1887.			House mouse.	
Locust Grove, N. Y.	Jan. 24, 1884.			Meadow mouse.	
Sing Sing, N. Y.	Jan. 13, 1885.			do.	

Summary.—Of 6 stomachs examined, all contained mice.

SCREECH OWL (*Megascops asio*).

Sing Sing, N. Y.	Aug. 31, 1885.				Remains.
Atlanticville, N. Y.	Dec. 4. 1885.			Mouse hair.	
Sing Sing, N. Y.	Sept. 25, 1886.				do.
Washington, D. C.	Nov. —, 1886.			Meadow mouse.	
Do.	do.			2 white-footed mice.	do.
Do.	do.				do.
Do.	do.				do.
Do.	do.			Mouse hair.	do.
Do.	do.		Tree sparrow.		
Do.	do.				do.
Do.	do.		Feathers.		
Do.	do.			Mouse hair.	
Do.	do.				do.
River Vale, N. J.	Nov. 20, 1885.				Larvæ.
Bergen county, N. J.	Nov. 26, 1885.			House mouse.	
Alfred Centre, N. Y.	Oct. 10, 1886.			White-footed mouse.	Grasshopper; crickets; crawfish.
Peterborough, N. Y.	Sept. 11, 1886.		Sparrow.	do.	Grasshoppers.
Amherst, Mass.	July 8. 1886.				Frog; remains.
Cleveland, Ohio.	Mar. 12. 1886.			Meadow mouse.	
East Hartford, Conn.	June 23. 1886.		3 small birds.		7 beetles.
Gainesville, Fla.	Mar. 12, 1887.				Grasshoppers; larvæ of beetles.
Washington, D. C.	Jan. —, 1887.			White-footed mouse; meadow mouse.	
Do.	do.			2 meadow mice.	
Do.	do.		Screech owl.		
Do.	do.		do.		
Do.	Feb. 15, 1887.			Mouse.	
Rockville Conn.	May 28. 1887.				Empty.
Do.	do.				Beetle.
Portland, Conn.	Oct. 22, 1886.				Spider.
Do.	Dec. 23, 1886.	Pigeon.			
Lockport, N. Y.	Jan. 7. 1888.				Crawfish.
Portland, Conn.	May 5, 1887.				7 May beetles.
Washington, D. C.	Feb. 13, 1887.			2 pine mice.	
East Hartford, Conn.	July 16, 1886.		2 English sparrows.		
Philadelphia, Pa.	Apr. 20, 1886.				May beetles.
Greensborough, Ala.					2 cicadæ.
Sandy Spring, Md.	Mar. 2, 1887.				Insects.
Do.	do.			2 mice.	
Chester county, Pa.	Jan. 11, 1886.			Mouse hair.	
Do.	Jan. 5. 1886.			House mouse.	
Do.	Apr. 22, 1886.		Feathers.		Beetle.
Do.	Jan. 7. 1887.		Feathers.		
Do.	Jan. 8. 1887.			House mouse.	
Do.	Nov. 10, 1887.			Meadow mouse.	
Do.	1876.			Meadow mouse; house mouse.	
Do.	Nov. 27. 1887.			White-footed mouse.	
Do.	do.				Empty.
Do.	Dec. 6, 1886.			Meadow mouse.	
Do.	Dec. 10. 1886.				Beetles.
Do.	do.				Empty.
Do.	Feb. 12, 1887.				Indeterminate matter.
Do.	Feb. 9. 1887.			House mouse.	
Do.	Feb. 18, 1887.			do.	
Do.	Jan. 15, 1887.			do.	
Do.	Jan. 17. 1887.			do.	
Do.	Dec. 27. 1886.			Mouse hair.	
Do.	Jan. 11, 1887.			House mouse.	
Do.	Feb. 9. 1887.				Trace.
Do.	Feb. 10. 1887.				Empty.

SCREECH OWL—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Chester county, Pa..	Jan. 17, 1887.	.....	.....	Mouse hair.	
Do.	Feb. 11, 1887.	.....	.....	.....	Empty.
Do.	June 7, 1884.	.....	.....	.....	Insects.
Do.	Jan. 8, 1885.	.....	.....	.....	do.
Do.	Jan. 6, 1885.	.....	.....	.....	do.
Do.	Dec. 18, 1886.	.....	English sparrow.	Mice.	
Do.	Nov. 17, 1880.	.....	*	*	
Do.	Nov. 26, 1880.	.....	.....	Mice.	
Do.	Aug. 20, 1876.	.....	.....	.....	Grasshoppers.
Delaware county, Pa..	Dec. 5, 1879.	.....	.....	Mice.	
Cedar county, Neb..	Sept. —, 1867.	.....	.....	.....	47 locusts; 12 other insects.
Do.	do.	.....	Small bird.	.....	32 locusts; 3 other insects.
Do.	June —, 1868.	.....	.....	.....	41 locusts; 22 other insects.
Dakota county, Neb..	July —, 1869.	.....	.....	Mouse.	69 insects.
Do.	Aug. —, 1870.	.....	.....	do.	38 insects.
Seward county, Neb..	Sept. —, 1872.	.....	.....	.....	67 insects.
Nemaha county, Neb.,	Sept. —, 1874.	.....	.....	.....	50 locusts; 16 other insects.
Lancaster co., Neb..	June —, 1875.	.....	.....	.....	49 locusts; 15 other insects.
Elmira, N. Y.,	Jan 29, 1886.	.....	English sparrow.	Mice.	
Do.	Jan. 30, 1886.	.....	Feathers,	do.	
Horseheads, N. Y.,	Feb. 4, 1886.	.....	English sparrow.		
Chemung, N. Y..	Mar. 7, 1886.	.....	.....	Field mice.	
Elmira, N. Y.,	Mar. 21, 1886.	.....	.....	Mice (?)	
Barton, N. Y.,	Apr. 13, 1887.	.....	Junco.		
Waverly, N. Y.,	Apr. 15, 1886.	.....	.....	.....	Insects.
Tioga, Pa.,	Oct. 5, 1886.	.....	.....	Mice.	
Wellsborough, Pa..	Oct. 8, 1887.	.....	English sparrow.		
Elmira, N. Y.,	Oct. 21, 1886.	.....	Shore lark.		
Do.	Oct. 23, 1886.	.....	.....	Mice.	
Do.	Oct. 25. 1887.	.....	English sparrow.		
Wellsburgh, N. Y..	Nov 2, 1886.	.....	.....	.....	Empty.
Canton, N. Y.,	Dec. 24, 1887.	.....	English sparrow.		
Washington, D. C.,	Mar. 25, 1888.	.....	.....	Meadow mouse.	Crawfish.
Do.	do.	.....	.....	.....	Empty.
West Chester, Pa.,	Jan. 6, 1887.	.....	.....	House mouse.	

Summary.—Of 94 stomachs examined, 1 contained poultry; 20, other birds; 41, mice; 1, other mammal; 1, frog; 35, insects; 3, crawfish; 1, spider; 1 indeterminate matter, and 7 were empty

GREAT-HORNED OWL (*Bubo virginianus*).

Chattanooga, Tenn..	Dec. 25, 1885.	Quail.			
New London, Wis.,	Oct. 25, 1886.	.....	.....	Fox squirrel.	
Chester county, Pa.,	May 11, 1886.	Guinea fowl.			
Adairsville, Ga.,	May 20, 1886.	.....	.....	.....	Beetle.
Lockport, N. Y.,	Jan. 2. 1887.	Fowl.			
Do.	.....	do.			
East Hartford, Conn.,	June 16, 1887.	do.	.....	Rabbit.	
Sing Sing, N. Y.,	Jan. 19, 1883.	Guinea fowl.			
Do.	July 9, 1884.	Fowl,	Robin.		
Do.	Nov. 12, 1884.	.....	.....	Shrew.	
Do.	Feb. 26. 1885.	.....	.....	Rabbit.	
Paint Rock, Texas,	Apr. 23, 1887.	.....	Cooper's hawk; lark-finch; mockingbird.		
Sandy Spring, Md.,	Mar. 12, 1887.	Pigeon,	.....	Meadow mouse.	
Chester county, Pa.,	Feb. 15, 1886.	.....	.....	Rabbit.	
Do.	Sept. —, 1878.	*			
Dakota county, Neb.,	July —, 1869.	.....	.....	Gopher,	30 insects.
Elmira N. Y.,	Oct. 4. 1885.	.....	.....	Skunk.	
Do.	Oct. 7, 1886.	Ruffed grouse.			
Corning, N. Y.,	Aug. 15, 1884.	.....	.....	Gray squirrel.	
Tyrone, N. Y.,	Sept. 4, 1886.	Poultry.			
Elmira, N. Y.,	Nov. 5, 1885.	do.			
Breesport, N. Y.,	Nov. 2, 1886.	.....	.....	Rabbit.	
Canton, Pa.,	Dec. 13, 1884.	.....	.....	Skunk.	
Tioga, Pa.,	Dec. 15, 1884.	.....	.....	Weasel (?)	
Gaines, Pa.,	Dec. 29, 1885.	Ruffed grouse.			

1. Chimney Swift. 2. Bank Swallow.

Males.

GREAT HORNED OWL—*Continued.*

LOCALITY.	Date.	Poultry or game birds.	Other birds.	Mammals.	Miscellaneous.
Elmira, N. Y.	Jan. 3, 1884,	Poultry.			
Do.	Jan. 5, 1885,	.....	.....	.....	Empty.
Big Flats, N. Y.	Jan. 17, 1886,	Poultry.			
Erin, N. Y.	Jan. 29, 1887,	Ruffed grouse.			
Sandy Spring, Md.	Apr. 7, 1888,	.....	.....	Rabbit.	

Summary.—Of 30 stomachs examined, 16 contained poultry or game birds; 2, other birds; 1, mice; 12, other mammals; 2, insects, and 1 was empty.

SNOWY OWL (*Nyctea nyctea*).

Washington, D. C.	Nov. 11, 1885,	.....	.....	.....	Empty.
Portland, Conn.	Nov. 20, 1885,	.....	.....	.....	do.
Keokuk, Iowa.	Dec. 6, 1886,	Prairie hen.	.....	Meadow mouse.	
Lockport, N. Y.	Nov. 17, 1886,	.....	.....	.....	do.
Do.	do.	.....	.....	.....	do.
Chester county, Pa.	Dec. 14, 1886,	.....	.....	House rat.	

Summary.—Of 6 stomachs examined, 1 contained game bird; 2, mice, and 4 were empty.

HAWK OWL (*Surnia ulula caparoch*).

Quebec, Canada.	Jan. 15, 1886,	.....	.....	Meadow mouse.	

Summary.—The 1 stomach examined contained a mouse.

BURROWING OWL (*Speotyto cunicularia hypogæa*).

Fort Buford, Dak.	Sept. 29, 1887.	.....	.....	.....	Grasshoppers.
Wayne county, Neb.	June —, 1868,	.....	.....	.....	62 insects.
Do.	do.	.....	.....	.....	Lizard; 30 insects.
Pierce county, Neb.	do.	.....	.....	.....	49 locusts; 17 other insects.
Do.	do.	.....	.....	Prairie dog.	46 locusts; 10 other insects.
Do.	do.	.....	.....	.....	54 locusts; 8 other insects.
Wayne county, Neb.	July —, 1869,	.....	.....	Mouse.	65 insects.
Sydney, Cheyenne county, Neb.	June —, 1875,	.....	.....	.....	59 locusts; 3 other insects.
Ogalalla, Keith county, Neb.	Sept. —, 1876,	.....	.....	Mouse.	51 locusts; 12 other insects.
Ogalalla, Keith county, Neb.	do.	.....	.....	.....	58 locusts; 4 other insects.

Summary.—Of ten stomachs examined, 2 contained mice; 1, other mammal; 10, insects.

Summary of Stomachs Examined.

Swallow-tailed Kite (*Elanoides forficatus*)	5
Mississippi Kite (*Ictinia mississippiensis*)	2
Marsh Hawk (*Circus hudsonsius*)	46
Sharped-shinned Hawk (*Accipiter velox*)	48
Cooper's Hawk (*Accipiter cooperi*)	46
Goshawk (*Accipiter atricapillus*)	6
Red-tailed Hawk (*Buteo borealis*)	311
Red-shouldered Hawk (*Buteo lineatus*)	102
Swainson's Hawk (*Buteo swainsoni*)	4
Broad-winged Hawk (*Buteo latissimus*)	22
Rough-legged Hawk (*Archibuteo lagopus sancti-johannis*)	28
Golden Eagle (*Aquilla chrysaetos*)	1
Bald Eagle (*Haliœetus leucocephalus*)	6
Prairie Falcon (*Falco mexicanus*)	1
Duck Hawk (*Falco peregrinus anatum*)	5
Pigeon Hawk (*Falco columbarius*)	19
Sparrow Hawk (*Falco sparverius*)	133
Total number of hawks	785
Barn Owl (*Strix pratincola*)	7
Long-eared Owl (*Asio wilsonianus*)	47
Short-eared Owl (*Asio accipitrinus*)	45
Barred Owl (*Syrnium nebulosum*)	37
Florida Barred Owl (*Syrnium nebulosum alleni*)	4
Saw-whet Owl (*Nyctala acadica*)	6
Screech Owl (*Megascops asio*)	94
Great-Horned Owl (*Bubo virginianus*)	30
Snowy Owl (*Nyctea nyctea*)	6
Hawk Owl (*Surnia ulula caparoch*)	1
Burrowing Owl (*Speotyto cunicularia hypogœa*)	10
Total number of owls	287
Total number of hawks	785
Total number of hawks and owls	1,072

NOTE.—Swainson's Hawk (*Buteo swainsoni*), the Prairie Falcon (*Falco mexicanus*), Florida Barred Owl (*Syrnium nabulosum alleni*), and Burrowing Owl (*Speotyto cunicularia hypogœa*) are the only birds mentioned in this report which are not included in the *fauna* of Pennsylvania.—B. H. WARREN.

THE FOOD OF CROWS.

By WALTER B. BARROWS, S. B., *Assistant Ornithologist.*

The economic status of the Common Crow (*Corvus americanus*) has been discussed so often, and yet with such uncertain results, that it was one of the first birds to receive attention when the division was organized in 1885, being particularly mentioned in the circular issued that year. Several hundred replies to the questions contained in that circular were received during that and the following year, and much additional information was collected by subsequent correspondence. A request for stomachs of the crow was contained in the circular issued in 1886, and, although the responses to this have not been as numerous as could be desired, a number of correspondents have given material assistance, so that it is possible to append to the present paper the results of the dissection of eighty-six stomachs of the Common Crow (*Corvus americanus*) and twelve of the Fish Crow (*Corvus ossifragus*). Thus the material at hand for a study of the food of crows, though by no means abundant, is nevertheless considerable, and sufficient progress has been made in its investigation to justify the publication of some of the results. One of the main objects of the present paper, however, is to call the attention of farmers and others to the disputed and unsettled questions relating to the crow and to secure their aid and coöperation in collecting evidence which will hasten a final settlement of these points.

It is unnecessary at the present time to refer to the numerous contributions to our knowledge of the crows' habits made from time to time during the last century, but it may be broadly stated that but three strong points in its favor have ever been claimed for the crow even by its warmest friends: These are (1) the habit of destroying injurious insects; (2) the habit of catching mice; and (3) the habit of eating carrion. A few writers, mainly men of very limited experience, have maintained, it is true, that the crow never does any harm worth mentioning; but the more rational of his defenders admit freely that a large amount of damage is done but claim that this is more than compensated by the good habits just specified. Of these, the carrion-feeding and mouse-eating habits have been the weaker arguments, and the place of the crow as a beneficial bird has rested mainly on the ground of its supposed services in the destruction of noxious insects.

On the other hand, the injuries inflicted by the crow are more varied, those most commonly complained of being:

(1) Destruction of young grain, particularly Indian corn on first coming up.
(2) Destruction of ripe or ripening corn and other grain.
(3) Destruction of ripe or ripening fruits of some kinds.
(4) Destruction of various other vegetable products.
(5) Destruction of the eggs and young of poultry.
(6) Destruction of the eggs and young of wild birds.

Nearly every one in the least familiar with the habits of the crow will readily admit that the bird is more or less beneficial or injurious in the ways indicated above, but the greatest diversity of opinion exists as to the degree of benefit or injury to be assigned to each category.

The division has succeeded in bringing together a large amount of *opinion* on these points, and a considerable amount of what may be regarded properly as *evidence*. Moreover, some additional charges against the crow have been preferred and some further claims of merit are brought forward. Statements of mere opinion

carry little weight unless the facts on which these opinions are based are fully known. On the other hand, the careful record of any actual experience with the crow is entitled to thoughtful consideration, the weight to be given to such evidence being modified only according to the known fitness or unfitness of the observer to appreciate all the elements entering into the case.

As the entire question relates primarily to the *food* of the crow, it is obvious that the careful examination of a sufficient number of crow stomachs would be the only certain method of settling all questions; but the number of stomachs required necessarily would be very great, and in order fully to weigh the evidence thus afforded, full notes as to locality, date, time of day, character of place where killed, age of bird, etc., are indispensable.

About one hundred stomachs, accompanied by such data, have been carefully examined thus far. Unfortunately, however, most of these stomachs were those of adult crows, and very few of them were taken during the spring and early summer, when the crow is supposed to be the most beneficial.

It has proved more difficult than was expected to secure crows during the spring and summer months, but a special effort will be made during the season of 1889, and it is hoped that a large number of stomachs may be collected and examined. Those of young crows are particularly desired, but those of crows of any age if taken during spring or summer will be very acceptable. Persons willing to aid the division in this way will be furnished with instructions and materials on application to the ornithologist,* and all costs of transportation will be defrayed by the department.

In response to questions relating to the food habits of crows replies have been received from upwards of five hundred persons, and the information afforded by these replies, in combination with the results of dissection, form the basis of the following report:

Injury to Indian Corn, Wheat, and Other Cereals.

It seems almost superfluous to say that the crow at certain times and places is very destructive to crops of sprouting grain, for its corn-pulling habits were well known even in colonial times, and from that day until the present, wherever the bird is at all abundant, a newly-planted cornfield without scare crows has been the exception and not the rule. Doubtless the destruction is greatest during the first week or two after the corn appears above ground, but if all reports are to be credited considerable harm is done by digging up the seed corn directly after planting, even before the grain has begun to germinate. One observer states that the crow eats corn "from ten minutes after planting until the blades are three inches high," and more than a score of other observers state definitely that the crow not only pulls up the young plants, but *digs* up the newly-sown seed.

The amount of damage to corn during spring and early summer is certainly very great in some sections, and undoubtedly it would be much greater but for the almost universal custom of protecting the fields in one way or another. Of course, it is absurd to say how great the loss *would be* in case all precautions were neglected, and even in the case of actual damage it is impossible to estimate fairly the amount of the loss. Among nearly two hundred and fifty reports of more or less serious injury, less than one-fifth contain any figures from which the actual loss can be inferred even approximately, while hardly a dozen state definitely the acreage planted and the proportion destroyed or damaged.

The following examples of the evidence on this question will give a fair idea of the harm *occasionally* done. It will be noticed that they represent widely separated sections of the country:

Osceola, Ark.—One flock ruined a field of several acres.

Coventry, Conn.—In one field of three acres about half was destroyed; other fields badly damaged, probably one-third pulled up.

Osceola, Ill.—Destroyed about two acres for me last year (1885) just as it was coming through the ground.

* Dr. C. H. Merriam, Ornithologist, U. S. Department of Agriculture, Washington, D. C.

Plymouth, Me.—Has been observed to destroy whole fields of from one to three acres.

Rochdale, Mass.—Crows this year (1885) pulled one-third or more of the corn in my field in spite of cotton lines stretched quite thickly over the fields.

Nebraska, Ind.—Have known the injury to amount to one-third of the crop.

Burlington, Iowa.—Have known one-third of a five acre field to require replanting.

Sand Hill, Mich.—Often destroys over half the crop when planted near a patch of woods. Fields sometimes are nearly destroyed.

Bolton, Mo.—One-third of a field of three acres was taken.

Madison, Nebr.—The damage along the woodlands of the Elkhorn is ten per cent. of the planting.

Caldwell, N. J.—Damage often from one-tenth to one-third of the field.

Alfred Centre, N. Y.—Sometimes they make a second planting necessary; in one case a field of three acres was almost entirely pulled up.

Ithaca, N. Y.—In spite of all our efforts they almost destroyed the crop in a large part of one field.

Locust Grove, N. Y.—In 1884 a large field was ruined by crows in spite of all precautions. It was "strung" at more frequent intervals than usual, a number of dead crows were displayed at various points, and it was replanted twice, but all to no avail, for almost the entire field was lost.

Penza, Ohio.—Once saw a field on the 4th of July which had been destroyed four times by crows, and they were still working on it.

Gap, Pa.—Think they sometimes destroy five per cent. of the crop.

Frogmore, S. C.—The damage sometimes amounts to over 50 per cent., but this is only in fields near woodland.

Brandon, Vt.—One-half to three-fourths of an acre was pulled from a three-acre field.

West Pawlet, Vt.—In 1883 and 1884 I knew the crows to pull the corn so completely in fields of ten or twelve acres that all the ground had to be planted over.

Omro, Wis.—One piece of four acres was about two-thirds destroyed.

The ten following samples may be taken as showing more nearly than the preceding the *average* character of the reports noting damage to young corn:

Smelley, Ala.—Much damage some years, others none at all.

Brookfield Centre, Conn.—A small piece in a secluded spot was almost entirely destroyed.

Vermillion, Dak.—In some fields on the Missouri bottoms crows often have destroyed two or three successive seedings of corn, but only in fields near timber.

Marietta, Ga.—The damage is sometimes excessive, depending largely on location of field.

Louisville, Ky.—The damage has been greatly exaggerated. Formerly it was sometimes great, but it is many years since crows have done any harm in my neighborhood by pulling up corn. They find other food in abundance and have forgotten their old habits.

South Frankfort, Mich.—Injurious only in exceptional cases, and to a limited extent.

Minneapolis, Minn.—The extent of the injury is measured only by the opportunity.

Watkins, N. Y.—Farmers complain of their pulling corn in the spring as soon as it appears above ground; and corn is injured in this way sometimes so that it harvests one-eighth to one-fourth less than if it had not been touched. But not one farmer in twenty is injured as much as stated.

Mount Vernon, Ohio.—Have known them to be quite troublesome in pulling corn when it is two or three inches high, * * * but their attacks appear to be only periodical, perhaps many years apart.

Berwick, Pa.—The damage is sufficient, sometimes, to compel the farmer to replant, yet the amount of injury done is not often of much account. There are exceptional cases when fields planted near their resorts have suffered considerably.

A careful examination of all the available evidence bearing on this question brings out one or two points which are doubtless familiar to many farmers, but may be new to some. Other things being equal, the greatest damage is done where crows are most abundant; and fields nearest their nests are much more likely to be plundered than those at a distance from woods. Nevertheless, in the latter case, if the fields are also at a distance from the farm-house and are not specially protected, they may suffer more than other fields which, although near the woods, are so situated as to be easily watched from the house. It is of the utmost importence, moreover, that the crows be prevented from *beginning* to take corn from a field; for after visiting it once they are far more likely to come again, and there is abundant evidence that after a crow has once formed the habit of corn-pulling it is almost impossible to prevent his gratifying his taste as long as he lives. This question will be fully treated under the head of insect food of the crow, and it need only be remarked here that, while crows undoubtedly eat many cut-worms and other insects, there is very little

evidence that they pull young corn for any other purpose than to get the kernel at the root.

The depredations of the common crow do not cease, except temporarily, when the young plants are too well rooted to be pulled with ease. After the ears are formed and the kernels well filled out the crow again visits the corn-fields, and sometimes does serious damage. At that time the young are as large as their parents, several families are commonly associated in a flock, and such a party is capable of a large amount of mischief in a comparatively short time. About fifty complaints of injury to "green corn," "corn in the milk," "roasting ears," and "ripening corn," have been received.

Injury to Other Cereals than Corn.

Although the crow attacks and injures other grains than corn its depredations on these crops are far less general and serious. About fifty reports of such injury have been received, the losses complained of relating to wheat, rye, oats, barley, and rice. As with corn, the greatest damage is done by pulling up the sprouting grain, but more or less is eaten while ripening, or even when hard.

Damage to Other Crops.

About a dozen reports, nearly all from New England and Canada, mention the crow as destructive to potatoes, the worst mischief being done by pulling up the young plants in order to get the partly decayed pieces planted as "seed." Occasionally sweet potatoes and beans are pulled up in the same way, and in rome of the southern states the crow digs up peanuts, both as seed and when ripening, sometimes causing considerable loss. The following notes from correspondents illustrate this class of injuries:

From S. F. Cheney, Grand Manan, New Brunswick:

The crow will take the potato seed out of the hill and pull up the potatoes when nearly ready to hoe.

From Manly Hardy, Brewer, Me.:

I have known newly planted potatoes to be destroyed by the acre. Have only known crows to attack potatoes within a few years (1885.)

From Charles F. Goodhue, Webster, N. H.:

Crows are very troublesome some years by pulling corn and digging up newly planted potatoes, destroying both just as they appear above ground. The damage done to corn and potatoes varies from a few hills to nearly two acres. Sometimes nearly the whole crop is destroyed.

From Walter Hoxie, Frogmore, S. C.:

The crow destroys seed corn and rice invariably, unless tarred. It is yet more destructive to peanuts and sweet potatoes.

From John M. Richardson, Daingerfield, Tex.:

I have known the crow, assembling in immense flocks, to do great harm to the pindar (peanut) crop in South Carolina. As the nuts approach maturity the fields had to be guarded by men and boys with guns from early dawn to late dusk.

In some parts of the country the crow seems to have acquired a taste for watermelons, doing no little damage to this important crop. Mr. H. E. VanDeman states that at one time, on his farm at Genoa, Kans., he was obliged to cover some of his watermelons with grass, weeds, etc., in order to protect them from a family of crows which otherwise would have ruined them all. They began to "plug" the melons as soon as they were nearly ripe, going from one to another until they found one which suited them, spoiling many which they did not eat. Reports of similar damage have been received from Georgia and South Carolina, one planter complaining that his melons are attacked before they are half grown, and another estimating his loss from the same cause at 10 per cent. of the crop.

Occasionally crows do much damage to ripening fruit, but they generally find an abundant supply of wild fruits, and do not care to run the risk of a near approach to the garden unless the display is particularly tempting.

From the fact that crows feed largely on wild grapes, it seems a little strange that

1. Crested Flycatcher. *2. Phœbe.*
3. Wood Pewee. *4. Acadian Flycatcher.*

Males.

they do not visit the vineyard more frequently, but as yet very few complaints on this score have been received. One vineyard of several acres being just outside the limits of the city of Washington, D. C., has suffered considerable loss for several years from the frequent attacks of crows. One of the assistant ornithologists visited it in September, 1886, and again in the same month in 1888, and found abundant evidence that the owner did not exaggerate when he stated his loss to be at least one-fourth of the crop. Not only were crows frequently seen eating the grapes, but two which were shot during the first visit had grape seeds in their stomachs.

Other Vegetable Food of the Crow.

In addition to the fruits and vegetables already mentioned as forming a part of the crow's food, there are very many wild fruits, berries, seeds and nuts, on which the crow feeds largely at times, but the consumption of which is of little account to the farmer under any circumstances.

The vegetable matter contained in the eighty-six stomachs examined was as follows:

Vegetable Contents of Stomachs.	No. of stomachs in which found.	Vegetable Contents of Stomachs.	No. of stomachs in which found.
Kernels of corn	35	Seeds of beach plum	2
oats	3	Virginia creeper (*Ampelopsis*)	2
wheat	2	dogwood (*Cornus*)	4
Remains of acorns or chestnuts	26	bayberry (*Myrica*)	3
cherries, cultivated varieties	8	common (harmless) sumachs (*Rhus*)	17
wild cherries	3	poison sumach and poison ivy (*Rhus*)	19
berries not identified	4	juniper or red cedar	1
haw berries (*Crataegus*)	1	bind-weed (*Polygonum*)	2
Fruit pulp, not identified	4	wild rice (*Zizania*)	1
Seeds of grape	7	Unidentified seeds	10
blackberries or raspberries	5	Sea-weed	4
pumpkin	2	Moss	1
cucumber or musk-melon	1		

The crow is known also to eat the berries of the wintergreen, poke-weed, elder, smilax and hackberry; and doubtless it also feeds upon numerous other berries and seeds.

During autumn, and especially in the districts where grain is not readily obtainable, a favorite food of the crow is acorns, beech-nuts, or chestnuts, immense quantities of which are consumed. It may be mentioned incidentally, also, that in parts of Louisiana and Texas, and probably in other states, the crow injures the pecan crop to a considerable extent.

The Distribution of Noxious Seeds.

An interesting fact, which has come to light recently through the examination of crow stomachs, is the discovery that the berries of poison sumach (*Rhus venenata*) and poison ivy (*Rhus toxicodendron*) are eaten in large numbers, by the crow.

The poison ivy (also called poison vine, poison oak, mercury, or mercury vine, etc.) is too well known to need any description. The poison sumach (also called swamp sumach, poison elder, poison dogwood, etc.) is a shrub or small tree, confined mainly to swamps and wet places, and less generally known than the ivy, though its poison is much more powerful. Both species bear straggling bunches of greenish-white waxy berries, which cling tightly to the stems through the entire winter and thus are readily obtained by crows even when the ground is deeply covered with snow. Each berry contains a single large seed or stone surrounded by a small amount of wax-like pulp which appears to contain considerable nutritious matter.

Stomachs of crows taken in every month from September to March, and in different localities from Massachusetts to Florida, were found to contain these seeds, some-

times in large numbers. In one case one hundred and fifty-three seeds of poison ivy were found in a single stomach; in several cases the number was more than one hundred, and the average in nineteen stomachs exceeded fifty.

At a large crow-roost on the Virginia side of the Potomac, near Washington, the droppings of the crows are literally full of these seeds, usually accompanied by many seeds of the harmless (red-berried) sumachs, and a still smaller number of those of the flowering dogwood (*Cornus florida*) and the sour gum (*Nyssa*). The same is true of the large roost near Baltimore, Md., whence Mr. C. L. Edwards, of the Johns Hopkins University, sent to the department seeds of all the above species more than a year ago. The seeds of poison ivy and poison sumach had been found previously in crow stomachs collected near Washington, but for lack of a good reference collection of seeds they remained unrecognized until December, 1888, when they were identified by the writer.

In order to give some idea of the number of these seeds consumed by the crow it may be stated that a single pound of the dried excrement taken from the roost in the National Cemetery at Arlington, February 8, 1889, contained, by actual count, 1,041 seeds of poison ivy, and 341 seeds of poison sumach, in addition to 3,271 seeds of other sumachs, 95 seeds of Virginia juniper, 10 seeds of flowering dogwood, and 6 seeds of sour gum. The material, which covered about four square feet, was taken at random from above the layer of leaves, and represents the average deposit on the roost. As the roost covers upward of fifteen acres, some idea may be formed of the number of those seeds deposited there.

It is a well-known fact that the germination of many kinds of seeds is hastened by their passage through the digestive organs of birds and other animals, and hence it was believed at once that the crow was aiding in the distribution of these poisonous plants. In order to place the matter beyond question, however, seeds taken from the Arlington roost were tested in several ways, and not only was their vitality found to be unimpaired, but they were found to germinate more quickly than seeds taken from the vine. Of one hundred seeds of *Rhus venenata* from the roost, moistened and kept warm, ten sprouted within forty-eight hours, and twenty more within the next five days. One hundred and fifty seeds of the same kind and from the same source were planted in a flower pot in the greenhouse, and at the end of fourteen days one hundred and thirty of them had become vigorous seedlings from one to two inches high, and several more were breaking the ground. Similar results were obtained with seeds of *Rhus toxicodendron* from the roost, while seeds taken from the vine had not sprouted at the end of fourteen days. Thus it becomes certain that these seeds are improved rather than impaired by their passage through the digestive organs of the crow, and this bird therefore is doing incalculable harm by sowing broadcast the seeds of a poisonous vine and a more poisonous shrub, both of which unfortunately are far too abundant already.

The Crow as a Destroyer of the Eggs and Young of Poultry and Wild Birds.

More than three hundred and fifty of our correspondents have contributed notes relating to the crow as a robber of the nests of domesticated fowls and wild birds. About seventy of these state simply that "no damage of this kind has been observed," but with this exception the evidence is almost wholly unfavorable to the crow. Two hundred and seventy-eight observers state distinctly that they know of more or less mischief of this kind committed by crows. One hundred and forty-seven have personal knowledge of its carrying off young chickens, and one hundred and seventy-four report damage to domesticated fowls. There are twenty-five complaints of injury to the eggs and young of turkeys, and about a dozen instances of similar damage to ducks and geese.

Rather more than ten per cent. of the reports on domesticated fowls state that the damage is slight or occasional, but on the other hand upward of fifty observers report frequent and serious depredations, many of them stating that the crows do much more damage than hawks. It is significant that out of more than three hun-

dred and fifty replies to the question covering the subject of damage to domesticated fowls and wild birds only five are positively favorable to the crow. Seventy others are negatively favorable in that they report no injury observed, without, however, giving any indication of the extent of the opportunities for observation. The reports of damage come from all parts of the United States and Canada where crows are found, and as a rule the notes are clear and exact.

As one result of all the information thus far collected it may be stated that the common crow is a serious enemy of poultry, all the more dangerous because so often unsuspected, and because of its remarkable cunning and stealth. It is also a skilful and inveterate robber of the nests and eggs of wild birds.

The entire evidence submitted on this subject is well worth reading, but lack of space forbids the insertion of more than a few examples under each of two heads.

Destruction of the Eggs and Young of Poultry.

More than one-third of all the reports relating to damage to poultry specify frequent or serious loss. It appears from these notes that not only does the crow rob the hens, ducks, and turkeys which steal their nests in the brush, woods, or meadows, away from the farm-yard, but it frequently comes within a few steps of the house or barn, destroying all nests not absolutely inaccessible to it or snatching up the downy young about the very doors. Usually such visits are made very early in the morning, or at times when no one is at hand to prevent the theft, but frequently the robber becomes emboldened by success and makes his visits in the middle of the day and with apparent disregard of all danger. Moreover, as in the case of some hawks and dogs, certain individuals become particularly addicted to chicken stealing, and return day, after day to the same place, seldom failing to secure a victim at each visit.

The following notes from different parts of the country will serve to illustrate the crow's methods in relation to eggs and chickens:

From Owen Durfee, Fall River, Mass.:

May 5 [1888], while walking by a farm-house near the city, I saw a crow sail over the house and finally settle down on a stone wall about one hundred feet from the house, and begin watching the young chickens running about in the lot and through the wall under him. One of the chickens ran under him, and after eyeing it a moment, he turned to the next one, which was perhaps a week or ten days old. When this one was about six feet from him, he dropped down over it and struck at it two or three times with his beak. Then he acted as though about to eat it on the spot, but a young rooster running at him, he picked up the chicken and carried it off still squeaking in his beak.

From William H. Lewis, Pawtucket, R. I.:

I have known the common crow to take chicks when they were from one to six weeks old. I know of a case where twenty have been lost this season.

From H. Neherling, Freistatt, Mo.:

I have frequently observed crows stealing the eggs from my poultry-yard. They do this very slyly and quietly. As soon as the eggs are hatched they carry off young chickens whenever they can get them. With the exception of Cooper's Hawk I do not know such a bold robber as the crow. One day in April one of these birds perched on the fence, only a few steps from my house. An old hen with about a dozen chickens which were only a few days old was in my barn-yard. Suddenly the crow swooped down, caught a chicken with its bill, and went off, flying away near the ground. In a few weeks the crows carried off about twenty chickens, which varied in age from one day to four weeks.

From H. R. Landis, Landis Valley, Pa.:

When the young are hatched the crows are very bold, coming up to buildings, and in one case that come under my notice they took from one to four chickens each morning, nearly annihilating a brood of about one hundred.

From J. W. Van Kirk, Milton, Pa.:

I have seen crows catch young chickens, and frequently have seen them carrying off eggs of both the domestic fowl and wild birds. We have had on different occasions whole nests of sitting turkeys and chickens robbed by them. In some cases the eggs were taken from under the hens while on their nests.

From J. V. Henry Knott, Kingston, N. Y.:

I have seen the common crow eat eggs, and have caught him by baiting a steel-trap with an egg. The man in charge of the gas-works at Saugerties told me this spring that he had to cover his chicken-yard with wire to save the chickens from the crows, and that he saw them catch the chickens repeatedly.

From Frank B. Hancock, Casky, Ky.:

The common crow undoubtedly catches young chickens and steals eggs. They have caused me more trouble in that respect than hawks. My home is situated on the south side of a woodland. A colony of crows located in that woodland in 1870. This spring (1885) I have watched them carefully, and have seen them steal chickens before they were past the *downy stage* and carry them away to their young. I have one crow family charged with $25 worth of nice chicks stolen in April and May, 1885.

Destruction of Eggs and Young of Wild Birds.

No observant person will deny that the crow does serious damage to the eggs and young of wild birds. The instances of such depredation which have come within the knowledge of most farmers or other persons living in the country are far too numerous to leave a shadow of doubt on this score in any unprejudiced mind.

Yet for every instance of such robbery witnessed by man thousands must take place without his knowledge. Persecution by crows is doubtless a very large factor among the influences which cause so many birds to crowd about human habitations during the nesting season, and yet the relentless crow follows them even to the eaves and window-sills of houses, taking their eggs and young in spite of every precaution.

The evidence on this point, contributed by our observers during the past few years, is replete with accounts of such forays, and the only wonder is that robins, thrushes, blackbirds, and many other species continue to rear any young at all. The reports on this subject number one hundred and fifty or more, and contain minute descriptions of the destruction by crows of the eggs or young of more than twenty-five species of wild birds. The list includes the robin, wood thrush and other thrushes, brown thrasher, wrens, English sparrows and other sparrows, blackbirds of several species, Baltimore and Bullock's orioles, woodpeckers, swallows, kingbirds, wax-wing, warblers, bluejay, Carolina dove, quail, prairie chicken, woodcock, night herons and other waders, wild ducks, and sea-gulls. In addition to these specific statements, very many observers state that all kinds of small birds suffer from crows, while others say that it kills "many kinds" or "all kinds which can be obtained."

Naturally the robin is one of the most frequent sufferers, and perhaps its losses are more likely to be noticed than those of less familiar birds. The following reports indicate something of the nature and extent of the inroads upon this species :

From Prof. F. E. L. Beal, Lunenburgh, Mass.:

I have known the crow to rob the nest of a robin of its eggs on several occasions, always at the first peep of light. In one instance the nest robbed was within six feet of the open window of a chamber where I slept.

From Charles F. Goodhue, Webster, N. H.:

The crow has been known to rob every robin's nest in a good-sized apple orchard, and to come within eight rods of the house and carry off four young robins in the course of one day.

From J. W. Van Kirk, Milton, Pa.:

Last spring (1886) out of ten robin's nests around our building, nine were robbed of eggs by the crow. One of the nests was not over twenty yards from the house. The robin lays from three to five eggs, and you can safely say that at least forty robins were thus destroyed inside of eight acres of ground.

From Dr. A. K. Fisher, Sing Sing, N. Y.:

A great number of nests of the robin, wood thrush, and, in fact, many other birds are robbed of their eggs, and I have often observed crows flying away with young birds in their bills, followed by the outraged parents.

In examining the contents of crow's stomachs in spring, I have detected the presence of birds' eggs in a number of cases.

1, 2. Evening Grosbeak, Male and Female.
3. Brown Creeper. 4. Black and White Warbler, Males.

From C. S. Paine, East Bethel, Vt.:

Crows come into our shade trees early in the morning and take the eggs and young of the oriole and robin; I think that over half of the nests of our small birds are destroyed by them.

From D. Y. Overton, Burlington, Iowa:

The common crow, especially at the east, is an inveterate robber of birds' nests, and also destroys their young. I have seen him at the nests of the robin with the eggs in his mouth; and have seen him with young bluejays in his beak as he took them from the nest.

From Charles A. Davis, Burlington, Vt.:

I have seen crows catch and carry to their nests eight or ten young bank swallows which were feathered out.

From Samuel N. Rhoades, Haddonfield, N. J.:

The crow steals eggs and young birds from the purple grackle, red-winged blackbird, robin, kingbird, Carolina dove, quail, and woodcock. It also destroys the eggs of several species of herons.

Prof. D. E. Lantz, of Manhattan, Kansas, writes:

I have not known the crow to trouble the poultry-yard in Kansas, but it is a noted robber of the eggs of quail and pinnated grouse.

Dr. A. B. MacCrea, of Berwick, Pa., writes:

A friend was mowing in the meadow this summer (1885) and uncovered a quail's nest containing some twenty eggs. He concluded to place them under a hen and went to the barn for a basket; when he returned a crow was finishing his dinner on the last egg.

In all the dark history of the crow's relations to other birds there is nothing which can be fairly called a bright spot, and only here and there a record is found which serves to render the page a little less gloomy. One of these grains of comfort is found in the fact that in its wholesale attacks on other birds a few species suffer which are scarcely better than itself. The bluejay and the purple grackle are known to destroy the eggs and young of smaller birds, and their own nests are frequently pillaged by the more powerful crow. Under favorable circumstances crows are known to destroy the eggs and young of the English sparrow, and they have done good service in this way about the Smithsonian Institution, in Washington, D. C., where it is no uncommon sight during the summer to see a crow (most often perhaps the Fish Crow) feeding on the young of these birds.

Insect Food of the Crow.

In attempting to study the insect food of the crow, two different questions present themselves at the outset. These are: (*a*) How many insects does the crow eat? and (*b*) What kinds of insects does it eat? The first question was answered in a general way more than half a century ago, and there is no reason now to deny the oft-repeated statement that the crow feeds largely on insects. The second question, however, is not only much more important, but much less easily answered; for not all insects are injurious, and comparatively few persons can discriminate between the useful and harmful, especially when watching them from a distance or examining those which have been crushed and swallowed by a bird.

While, therefore, the field-notes of casual observers may help materially to answer the question as to the extent to which the crow feeds on insects in general, they can seldom be relied upon for an accurate knowledge of the insect species destroyed. As already stated, this latter question must be answered mainly by the critical study of the stomach-contents of large numbers of crows. Nevertheless, the accumulated observations of years as to the crow's manner of feeding, together with notes on places most visited at certain times, and the insects most abundant in those places at such times, must not be disregarded, many such observations being of the greatest practical value.

In the course of the present investigation on the crow, hundreds of notes on its insect-eating habits have been received from correspondents, and in many cases the observations are of greatest interest and value. Not a few of these notes relate to observations made under peculiarly favorable circumstances, and though we cannot feel perfectly sure of the correct identification, for example, of the Hessian fly and army-worm, we see no reason to doubt the statements of any farmer as to grasshop-

pers and potato beetles, or even cut-worms and "white grubs." It is true they may not know the scientific names of the particular species of grasshoppers or grub noted, but the observation, though *less* valuable on this account, is still of definite worth. A few observers have examined stomachs of crows occasionally, and their testimony in regard to the insects found therein therefore possess unusual value, but the larger number by far base their statements entirely on field observations.

A few farmers contend that the crow rarely or never eats insects of any kind, while others simply state that they have never seen it do so, and express a favorable or unfavorable opinion as to the probability of such a habit. These, however, are individual exceptions, the great majority of observers stating emphatically that the crow does eat insects, and that he eats many; in fact, the unanimity of opinion on this point is rather surprising, and much of the most favorable testimony comes from men who are most severe on the crow as regards its other habits.

In this connection, the evidence furnished by the stomachs examined in the division during the past year is interesting. The insects contained in these stomachs have been submitted to the entomologist of the department, and a summary of the results of his examination will be found in another place; but while examining the other components of the food it was easy to separate the insect material from the rest, and to estimate the proportion which it formed of the entire food.

The following table, showing the amount of insect food in the stomachs examined, contains several points of interest:

Table showing the amount of insect food in the stomachs of eighty-six crows (Corvus americanus), arranged by months:

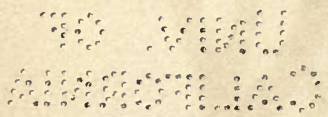
MONTH.	Number of stomachs examined.	Number of stomachs containing insects.	Percentage of stomachs containing insects.	Average percentage of insect food in stomachs containing it.	Average percentage of insect food in all stomachs examined.
January,	14	4	28.6	7	2
February,	6	1	16.7	1	.17
March,	1	1	100	1	1
April,					
May,	3	3	100	76	76
June,	3	3	100	14.7	14.7
July,	16	14	87.5	32.6	28.5
August,					
September,	7	6	85.7	33	28.3
October,	13	10	76.9	12.8	9.8
November,	3	3	100	17.3	17.3
December,	20	18	90	5.9	5.4
	86	63	73.2	19.7	14.5

It appears from the above table that sixty-three of the eighty-six stomachs of the Common Crow which were examined, or more than seventy-three per cent., contained some insect food, the average amount in each of the sixty-three stomachs being nearly twenty per cent., or one-fifth of the entire food. Fourteen and one-half per cent. of all the food contained in the whole eighty-six stomachs consisted of insects, and this in spite of the fact that two-thirds of these stomachs were from birds taken during the colder half of the year, namely, between October 1 and April 1.

At first sight it seems still more remarkable that ninety per cent. of the stomachs taken in December contained some insect food, while but eighty-seven and one-half per cent. of those taken in July contained insects. Those taken in July, however, contained in the aggregate more than five times as much food of this kind as those taken in December.

Again, of the fourteen stomachs taken in January, but four contained insect remains, as against eighteen out of twenty taken in December. By consulting the detailed results of the examination, however, the reason is evident; for ten of the January birds were taken at East Hartford, Conn., when the ground was mostly covered with snow, while most of the December birds were taken near Washington, D. C., when the ground was mostly bare.

1, 2. Pine Grosbeak, **Male and Female.**
3. American Crossbill. 4. White-winged Crossbill, **Males.**



These few facts show how essential is the examination of large numbers of stomachs in order to secure accurate results, but nevertheless it is impossible to avoid the conclusion that crows eat insects freely at all seasons of the year, and that the main reason why they do not eat as many in cold weather as in warm is simply because they are not to be had then. These conclusions receive additional confirmation from the reports of observers, very many of whom state that the crow feeds on insects at all times of the year, but is especially destructive to them when they are exceptionally abundant.

Turning now to the reports of observers as to the *kinds* of insects eaten, we find additional testimony favorable to the crow.

The following list gives the names of all insects on which the crow is said to feed, together with the number of observers reporting each kind:

NAMES.	No. of reports.	NAMES.	No. of reports.
Insects of all kinds,	11	Army worms,	3
Insects, kind not specified,	54	Tobacco worms,	2
Grasshoppers,	80	Earth worms,	7
Crickets,	8	Worms, kind not specified,	10
"Locusts,"	4	Ants,	2
Seventeen-year cicada,	2	"Bugs," kind not specified,	6
"White grubs,"	32	Tent caterpillar,	1
Grass, kind not specified,	49	Apple tree worm,	1
Cut worms,	44	Canker worm,	1
May beetles,	5	Corn worm,	1
"June bugs,"	2	Bud worm,	1
Potato beetles,	6	"Millers,"	1
Beetles, kind not specified,	13	Hessian fly,	1
Caterpillars,	7	Cocoons,	2
Wire worms,	6	Crysalids,	2

A glance at the above list shows that certain groups of insects are reported by large numbers of observers, and it is interesting to note that in almost every case the insects so reported are decidedly injurious. Thus grubs and "white grubs" aggregate eighty-one reports, cut-worms are mentioned in forty-four, and grasshoppers in eighty.

Among the numerous reports which mention a considerable variety of insects the following may be instanced:

From William Proud, Chico, Cal.:

It is a great devourer of grubs, caterpillars, chrysalises, etc.; including wire-worms, larvæ of cockchafer, beetles, army-worms, grasshoppers, and any other noxious vermin that falls in the way.

From E. E. Mason, Accotink, Va.:

I have have had them follow me all day when I have been plowing, picking up the grub-worms. They are evidently voracious feeders and not nice as to diet, but doubtless drew the line on any of the caterpillar family. A friend of mine having shot one cut his craw open and found so many insects that he said he had killed his last crow. I think if the crow was less disturbed there would be less wormy roasting ears.

From T. Scott Fisher, East Brook, Pa.:

I watched a pair of crows follow me day after day last spring [1886] while plowing sod, and saw one crow pick up twenty-five to forty white grubs, cut-worms, and wire-worms at one time and then fly to the woods for an hour or so, then back and at it again.

From William G. Coutan, Brackney, Pa.:

I am convinced from personal observation that the crow pulls corn in search of grubs and worms. For where large quantities have been pulled up the grain is left intact on the sprout.

From F. R. Welsh, Philadelphia, Pa.:

On three or four occasions I have known crows to pull up corn from two to four inches high. I do not think they eat the green top; their object seems to be to get at the seeds, which they invariably eat.

From John C. Linville, Gap, Pa.:

It feeds largely on the large white grub, the larvæ of the May beetle. When the common cut-worm is very numerous I have seen the crow dig something out of the hill of corn and leave the corn unmolested; I think he was catching the worms.

From D. E. Pannepacker, Chalfont, Pa.:

A field of corn is adjacent to my school-house. On the 13th of May the corn was planted, and on the 22d of May I first noticed the tender shoots above the ground. The field previous to the cultivation was covered with a thick growth of sod, favorable to the existence of the grub and wire-worm. It was but natural, too, for these insects to remain, and not having the tender shoots of timothy, clover, and other grasses to satisfy their appetites, they turned their attention to the growing corn. The despised crow here rendered most excellent service, for though he pulled up the corn, I noticed each time the well known track of the wire-worm, or the worn path of the grub.

When the seventeen-year cicada appeared this summer (1885) the crow fed extensively on both its pupæ and imagoes. The young were fed to some extent on the pupæ on May 30. As they had not at this time appeared above the ground, I suppose the crows obtained them in plowed fields.—(*M. J. Perry Moore, Phila., Pa.*)

The Crow an Enemy to Grasshoppers.

Probably the most marked example of the good which crows do by destroying insects is found in their attacks on grasshoppers, crickets, and kindred insects. Eighty observers report the crow as feeding extensively on grasshoppers, and there can be no doubt that much good is done in this way. The following examples show something of the extent of the benefit occasionally done.

From A. I. Johnson, Hydeville, Vt.:

Crows have some very good qualities, catching countless numbers of crickets and grasshoppers after the hay is cut. They can be seen at almost any time of day on the meadows catching grasshoppers. I observed one pair of old crows this summer (1885) when I was haying, that were feeding their young almost entirely (if not quite) on grasshoppers; the old crows would alight on the mown land within eight or ten rods of me, and after catching a hopper or two would fly to their young that were on the fence and there feed them with the hoppers.

From W. E. Saunders, London, Ontario, Canada:

Last summer (1885) I watched a flock of probably two thousand crows catching grasshoppers.

From J. B. Underhill, Fork Union, Va.:

As to the insect diet of the adult I cannot testify, having never examined the gizzards. The gizzards of two young which were taken from the nest were filled to overflowing with grasshoppers, and each contained one or two kernels of corn.

From Morris M. Green, Boonville, N. Y.:

Near Boonville I have seen the common crow feeding on grasshoppers during the summer months. Some fields seemed to be fairly black with the birds pursuing the grasshoppers in every direction. One day noticing a flock of crows frequenting a particular field, I visited the place, and found that the roots of the grass had been completely eaten away, so that the sod or turf could be taken by the hand and rolled up like a rug or carpet. A farmer living in the vicinity told me that the crows visited the place every day to feed upon the grubs that destroyed the turf in this way. The grubs or larvæ were about three-fourths of an inch in length; body whitish, with some dull plumbeous underneath; head blackish.

The Insect Food of the Crow as Revealed by Examination of Stomachs.

Among the eighty-six stomachs of the Common Crow examined, sixty-three were found to contain insect remains, and these remains were submitted to the entomologist of the department, Prof. C. V. Riley, who caused a critical study of them to be made, and has in preparation a full report, showing the number and kinds of insects represented in each stomach, with notes as to their habits and economic importance. A brief summary of the more important facts brought out by this investigation is given herewith. It has been prepared by the writer from a preliminary report to the entomologist by Tyler Townsend, assistant, who, with the aid of the other members of the entomological force, made most of the determinations. The full report will appear in a bulletin on the crow, which is now in preparation in the ornithological division.

The stomachs examined contained the remains of about ninety-two species of true insects, represented by about five hundred specimens. About ten per cent. of these cannot be classed properly as either beneficial or injurious, and the remainder

are divided pretty evenly between the two. The following table shows the orders represented, as well as the number of species and individuals in each, and these are further classified under the heads beneficial, injurious and neutral:

Table showing the nature of the insect food in sixty-three stomachs of the Common Crow.

	SPECIES.				INDIVIDUALS.			
	Beneficial.	Injurious.	Neutral.	Total.	Beneficial.	Injurious.	Neutral.	Total.
Hymenoptera	16	1	....	17	126	8	....	134
Lepidoptera	....	6	....	6	....	16	....	16
Diptera	1	....	....	1	1	....	....	1
Coleoptera	23	16	8	47	85	57	32	174
Hemiptera	1	1	3	3	1	1	1	3
Orthoptera	....	17	....	17	....	150	....	150
Neuroptera	....	....	1	1	....	....	18	18
Total	41	41	10	92	213	232	51	496

In addition to the true insects mentioned above, the stomachs contained remains of at least three species of spiders and two of myriapods, sixteen specimens in all, and all beneficial.

The order Coleoptera (beetles) is most numerously represented, and a majority of the species are beneficial. It is an interesting fact that no less than eighteen species of predaceous beetles (*Cicindelidæ* and *Carabidæ*) are included in this number, together with nearly a dozen species of the scavenger beetles (*Scarabæidæ*). Some of these are species possessing disagreeable odors, and it is somewhat surprising that the crow should take them unless other food was scarce. They occur most abundantly, however, in stomachs taken in May, June and July, when other food must have been abundant. Among the injurious beetles identified are the flat-headed apple-tree borer (*Chrysobothris*), of which a single specimen was found; May beetles (*Lachnosterna*) in five stomachs (nine specimens in one); and a few other borers and leaf-feeders. Three small weevils were taken from one stomach and considered "injurious insects," as they are, but it is probable that they were hidden in kernels of corn which were eaten by the crow.

The order Orthoptera (grasshoppers, crickets, etc.) is well represented by one hundred and fifty specimens belonging to seventeen species. Twenty-eight stomachs contained examples of this order, and the results of stomach examination in this case bear out the statements of observers and show that in this direction the work done by the crow is entirely beneficial, as all these insects are more or less injurious.

The order Hymenoptera, including the wasps, bees, ants, etc., is represented in the material taken from the crow stomachs by one hundred and thirty-four specimens belonging to seventeen species, all but one of which are beneficial. A species of saw fly, decidedly injurious, was found in one stomach, and seven larvæ of the same or another species in a second stomach. One of these stomachs, however, also contained the remains of a young bird, apparently a nestling, and it is not improbable that the saw flies came from this source. Two other stomachs contained remains of ichneumon flies belonging to different genera. These are among the most beneficial of insects, destroying particularly large numbers of caterpillars.

Only one other order requires special mention, viz., the Lepidoptera. In this are included the butterflies and moths the larvæ of which are almost invariably destructive. Contrary to what might have been expected, the crow stomachs do not show many representatives of this order. Six species, five of which are decidedly injurious, were recognized, but the sixteen specimens were distributed among nine stomachs. The family *Noctuidæ*, which includes the cut-worms, was represented by nine specimens in six stomachs; that is, but six crows out of eighty-six had eaten any cut-worms.

In concluding this imperfect summary of the insectivorous habits of the Common Crow it must be conceded that the showing is not very favorable for the bird.

Considering merely the testimony of observers, the conclusion would be favorable in the main, for it appears that the crow eats insects throughout the season, at many times in large quantities, and often of the most injurious kinds. To be sure they are mainly terrestial or subterranean kinds, but they are decidedly injurious in the main, and few, if any, beneficial insects are said to be taken.

In the light of the stomach examinations, however, the case assumes a different complexion, for although the evidence from this source confirms in some respects the testimony of observers, it indicates also that beneficial and injurious insects are taken in nearly equal quantities, and thus the good done at one time may be fully neutralized at another. The force of this point is much weakened by the small number of stomach examinations made, and by the fact that so few crows were taken during the summer months; but the *indications* point to an omnivorous habit in general, and to the destruction of good and bad insects indiscriminately.

As has been suggested by many previous writers and reiterated by numbers of our own observers, the harm done in the destruction of eggs and young of insectivorous birds during spring and early summer is beyond all computation; and it is difficult for one familiar with the magnitude of the crow's iniquity in this direction to believe that any destruction of injurious insects or other animals can fully atone for it. Yet even here another factor should be taken into account, as it must be borne in mind that many of the small birds killed by the crow are not strictly insectivorous, while some of them, in their thefts of fruit and other crops, continually tend to even their own accounts with the farmer, and occasionally even overdraw them.

The Crow as an Enemy to Field Mice and Other Small Quadrupeds.

Aside from the insect-eating habits of the crow its most beneficial trait probably is the killing of field mice. Of these it is a great destroyer, hunting up the nests and devouring young and old whenever they can be caught. There is abundance of evidence that crows are very skilful at such hunting, and undoubtedly they form one of the strong checks on the increase of these prolific and destructive rodents. Among the reports of our correspondents are twelve which mention this habit of mouse-hunting, and from these we select a few:

From James O. Whittemore, Fairfield, Me.:

I have observed crows catching insects and field mice all the year round. The general impression among farmers is to tolerate crows at all seasons except the early spring.

From F. A. Sampson, Sedalia, Mo.:

After mowing I have seen crows feeding on what I supposed to be grasshoppers; they also catch and eat mice.

We have received one report also from William J. Howerton, of Florence, Ariz., who writes as follows:

The Common Crow of this section is of some economic value, as I have observed it catching and killing the common pocket gopher.

Miscellaneous Animal Food of the Crow.

Probably no family of birds in existence is more truly omnivorous than the crows; almost anything eatable is utilized when hunger presses, though at other times they are more scrupulous about their food. It is useless, therefore, to attempt to give a complete category of the items which may enter into the crow's diet, and as many of them have no bearing on the economic aspects of the question it is unnecessary to dwell on the subject here; any one who is curious to know exactly what ninety-eight crows had eaten just before they were killed can consult the list of stomach examinations with which this paper concludes.

The animal matter contained in the stomachs of eighty-six common crows examined was as follows:

1. *Tree Sparrow.*
2. *Snowflake.*
3. *Worm-eating Warbler.*
4. *Magnolia Warbler.*

Animal Contents of Stomachs.	No. of stomachs in which found.	Animal Contents of Stomachs.	No. of stomachs in which found.
Carrion	14	Remains of other crustaceans	5
Remains of mice	4	mussels or clams	4
snake	1	snails of various kinds	6
frogs	5	insects	63
salamander	1	spiders	2
fish	9	myriapod	1
crayfish	6		

The following statement from Mr. John M. Richardson, of Daingerfield, Tex., is interesting in this connection from its novelty. Mr. Richardson writes:

The crow is known to catch young terrapins, and there is reason to believe that it destroys other small reptiles. I remember a rock-crowned hill on the east bank of the Wateree, between Manchester and Statesburgh, in Sumpter county, Ga., that was almost covered with remains of small terrapins and land tortoises carried there, killed, and devoured by crows.

Results in Detail of the Examination of Stomachs of the Common Crow (*Corvus americanus*).

[Note.—The following records of dissection are from examinations of stomachs preserved in alcohol and forwarded to the Department of Agriculture by the collectors whose names accompany the records in the list below. Unless otherwise stated the determinations of the various items of stomach contents have been made entirely by members of the division, the writer being responsible for the larger part. The percentages of the food elements in each case are to be regarded simply as approximate; they are merely careful estimates, no exact measurement being practicable. As elsewhere stated, the remains of insects were referred to the entomologist of the department, for critical study, and a summary of his preliminary report has been given on a previous page.]

2648. Male. Schraalenburgh, N. J. January 2, 1886; 9.30 a. m. F. J. Dixon.
Animal matter, 0 per cent.; vegetable, 90; gravel, etc., 6; indeterminate, 4. Stomach less than half full.
Contents.—Fragments of corn, acorns, etc.; 3 bits of insect legs; fine mud-like matter not determined; a little sand and gravel.

2649. Female. Schraalenburgh, N. J. January 2, 1886; 10.30 a. m. F. J. Dixon.
Animal matter, 7 per cent.; vegetable, 90; gravel, etc., 3. Stomach well filled.
Contents.—Remains of corn, pumpkin and cucumber seeds and perhaps other seeds; remains of muscular fiber, probably from a mussel or clam as some of it was attached to a piece of a shell, apparently that of bivalve; a few bits of shell and a little sand; no remains of insects.

7012. Chester county, Pa. January 12, 1887. Dr. B. H. Warren.
Animal matter, 25 per cent.; vegetable, 50; gravel, etc., 25. Stomach about two-thirds full.
Contents.—A few bits of corn (kernels), and a large amount of hulls of corn or other grain, with some other vegetable fiber; 4 seeds of poison ivy (*Rhus toxicodendron*); 2 vertebræ of small bird* and several fragments of bone of small fish*; 3 or 4 small beetles and a large quantity of other insect remains and one spider; a good supply of coarse gravel.

7013. Chester county, Pa. January 15, 1887. Dr. B. H. Warren.
Animal matter, 1 per cent.; vegetable, 90; gravel, etc., 9. Stomach about three-fourths full.
Contents.—One hundred and fifty-three seeds of poison ivy (*Rhus toxicodendron*), about 125 seeds of sumach (*Rhus glabra*); egg-case of a spider; insect remains; a fair amount of sand and gravel; a quantity of finely pulverized vegetable matter mixed with fine sand.

4432. Male. East Hartford, Conn. January 15, 1887; a. m. Willard E. Treat.
Animal matter, 10 per cent.; vegetable, 75; gravel, etc., 15. Stomach well filled.

* These bones were identified by F. A. Lucas.

Contents.—Remains of kernels of corn, forming about 70 per cent. of entire stomach contents; about 15 seeds of common sumach (*Rhus*) and 1 seed of poison sumach (*Rhus venenata*); about 10 per cent. of bits of flesh and ligament of some animal, probably carrion; a large amount of clean sand without pebbles; no insect remains.

4433. Female. East Hartford, Conn. January 15, 1887; a. m; Willard E. Treat.
Animal matter, 15 per cent.; vegetable, 10; gravel, etc., 75. Stomach less than half full.

Contents.—Three unknown seeds, probably of apple, pear, or quince; a smali amount of vegetable matter like pulp of fruit; a single hog bristle and a number of bits of meat, probably carrion; a large amount of sand without any gravel or pebbles; no insect remains.

4434. Female. East Hartford, Conn. January 16, 1887; a. m. Willard E. Treat.
Animal matter, 15 per cent.; vegetable, 10; gravel, etc., 75. Stomach about half full.

Contents.—A few skins of berries or seeds in small bits, and a little other fine vegetable débris; a single hog bristle and bits of animal tissue, probably carrion; about 2 per cent. of insect remains, all of a single insect; a large amount of sand, and two or three small pebbles.

4435. Male. East Hartford, Conn. January 16, 1887; 2 p. m. Willard E. Treat.
Animal matter, 5 per cent.; vegetable, 3; gravel, etc., 92. Stomach almost empty.

Contents.—One or two hog bristles and a few shreds of animal membrane, probably carrion; a few bits of hulls of corn or other grain; a little sand and many small fragments of some hard black mineral; no insect remains.

4436. Female. East Hartford, Conn. January 16, 1887; 2 p. m. Willard E. Treat.
Animal matter, 35 per cent.; vegetable, 60; gravel, etc., 5. Stomach about half full.

Contents.—About 100 seeds of poison ivy (*Rhus toxicodendron*), and 7 seeds of common sumach (*Rhus*); about 35 per cent. of shreds and bits of animal membrane, probably carrion; a little sand and five or six small pebbles; no insects.

4437. Male. East Hartford, Conn. January 16, 1887; 2 p. m. Willard E. Treat.
Animal matter, 40 per cent.; vegetable, 10; gravel, etc., 50. Stomach almost empty.

Contents.—Two seeds of harmless sumach (*Rhus*) and a few hulls and skins of other seeds or grain; one hog bristle and a few shreds and small masses of muscle and tendon, probably carrion; sand without pebbles; no in sects.

4438. Male. East Hartford, Conn. January 16, 1887; 2 p. m. Williard E. Treat.
Animal matter, 14 per cent.; vegetable, 85; gravel, etc., 1. Stomach well filled.

Contents.—Remains of about 20 kernels of corn, 9 or 10 of them nearly entire; about 80 seeds of harmless sumach (*Rhus*); one or two hog bristles, and many shreds and bits of meat, probably carrion; a very little sand; no insects.

4450. Female. East Hartford, Conn. January 31, 1887; 10 a. m. Willard E. Treat.
Animal matter, 5 per cent.; vegetable, 48; gravel, etc., 47. Stomach well filled.

Contents.—Remains of kernels of corn, mostly hulls; one or two small shreds of meat (carrion?); a dozen or more caddis-fly cases and some of the legs of the larvæ [Tyler Townsend]; a large amount of sand and gravel.

4451. Male. East Hartford, Conn. January 31, 1887; 10 a. m. Williard E. Treat.
Animal matter, 50 per cent.; vegetable, 50; gravel, etc., 0. Stomach less than half full.

Contents.—Scraps and shreds of meat and animal membrane (carrion?); about 120 seeds of harmless sumach (*Rhus*), and other remains of the berries; no gravel or sand; no insects.

4452. Male. East Hartford, Conn. January 31, 1887; 10 a. m. Williard E. Treat.
Animal matter, 50 per cent.; vegetable, 42; gravel, etc., 8. Stomach well filled.
Contents.—Shreds and tendinous masses of animal matter, probably carrion; remains of a few acorns or chestnuts; 77 seeds of poison ivy (*Rhus toxicodendron*); about 175 seed of harmless sumach (*Rhus*); a small amount of gravel and sand; no insects.

3059. Male. Sandy Spring, Md. February 4, 1887; a. m. H. H. Miller.
Animal matter, 0 per cent.; vegetable, 87; gravel, etc., 10; indeterminate, 3. Stomach well filled.
Contents.—Corn almost entirely, more than half of it in large pieces, some nearly entire kernels and a large quantity of hulls; about 10 per cent. of gravel and sand, the bulk of it being rusty quartz; a small amount (3 per cent.) of fine "mud," not identifiable; no insects.

4461. East Hartford, Conn. February 14, 1887; 10 a. m. Willard E. Treat.
Animal matter, 40 per cent.; vegetable, 50; gravel, etc., 10. Stomach well filled.
Contents.—Remains of corn and perhaps other grains, with a few bits of grass and hulls of seeds; about 60 seeds of harmless sumach (*Rhus*), apparently of two distinct species; 2 seeds of red cedar (*Juniperus*); a large amount of muscular fiber, fat, and sinews, probably carrion; sand and gravel; no insects.

4462. Female. East Hartford, Conn. February 14, 1887; 10 a. m. Willard E. Treat.
Animal matter, 5 per cent., vegetable, 45; gravel, etc., 50. Stomach nearly empty.
Contents.—Remnants of corn and hulls; a few bits of acorn shells; a bit of skin (without hair) of some animal; a single hog bristle; a fair amount of fine sand, and two or three small pebbles; no insects.

4463. Female. East Hartford, Conn. February 14, 1887; 10 a. m. Willard E. Treat.
Animal matter, 1 per cent; vegetable, 45; gravel, etc., 50; indeterminate, 4. Stomach about half full.
Contents.—About 100 seeds of harmless sumach (*Rhus*), and a considerable amount of hulls, skins, etc., of these or other seeds and fruits; a few minute bits of the hard parts of insects; a little very fine black "mud," not determined, sand, gravel, and bits of coke.

4464. Male. East Hartford, Conn. February 14, 1887; 10 a. m. Williard E. Treat.
Animal matter, 75 per cent.; vegetable, 0; gravel, etc., 25. Stomach almost empty.
Contents.—One hog bristle; a very little muscular fiber and sinew and some fat, doubtless all carrion; a small amount of fine sand; no insects.

3139. Male. West Goshen, Pa. February 15, 1886. Dr. B. H. Warren.
Animal matter, 5 per cent.; vegetable, 93; gravel, etc., 2. Stomach about half full.
Contents.—Remains of numerous kernels of corn; 6 seeds of sumach; a small bone from tarsus or carpus of some animal, apparently of the size of a dog or sheep; a single piece of slate about one-half inch long; no insects.

1331. Male. Washington, D. C. March 13, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 97; gravel, etc., 2. Stomach well filled.
Contents.—Unidentified vegetable matter mainly; a few bits of corn or other grain, with some hulls, bits of grass, and what appears to be young sprouts of some vegetable; 3 or 4 small seeds not identified; a single claw of a crayfish and a few bits of insect remains; no pebbles and very little sand.

1379. Young. Saint Louis, Mo. May 23, 1885. Otto Widmann.
Animal matter, 99 per cent.; vegetable, 0; gravel, etc., 1.
Contents.—Many bones of frog; numerous fragments of insects; a very little sand.

5510. Nestling. Gainesville, Va. May 13, 1887; 5 p. m. Dr. A. K. Fisher.
Animal matter, 90 per cent.; vegetable, 0; gravel, etc., 0; indeterminate, 10. Stomach well filled.
Contents.—Mainly insects; a few bones of a small frog; about 10 per cent. of fine "mud," apparently a mixture of animal, vegetable, and mineral matter, but not determinable; no sand or gravel.

5511. Nestling. Gainesville, Va. May 13, 1887; 5 p. m. Dr. A. K. Fisher.
Animal matter, 90 per cent.; vegetable, 7; gravel, etc., 1; indeterminate, 2. Stomach about two-thirds full.
Contents.—Six or eight small pieces of vegetable matter, apparently bits of an acorn or chestnut; a few shreds of vegetable fiber; 2 or 3 minute bones of a fish; 3 bits of shell, probably of snail; a single small pebble and a few grains of sand; a large amount (nearly 90 per cent.) of insect remains, among which pieces of beetles are numerous; a small amount of fine mud-like material, probably from the insects.

2514. Adult female. Sing Sing, N. Y. June 30, 1886; 3 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 99; gravel, etc., 0. Stomach full.
Contents.—Mainly corn, one whole kernel and many large pieces, and a large amount of hulls and finely pulverized corn; 3 stones of cherries (cultivated), a few bits of black vegetable material like the shell of an acorn; a few bits of the hard parts of beetles; no sand or gravel.

2677. Young. Englewood, N. J. June 27, 1886; 5 p. m. F. M. Chapman.
Animal matter, 95 per cent.; vegetable, 5; gravel, etc., 0. Stomach well filled.
Contents.—Remains of small bird, apparently an unfledged young; remains of insect larvæ and insects, but these *may* have come from the stomach of the young bird eaten by the crow; a few bits of the hulls of corn, and other vegetable débris.

3045. Adult (?). Peterborough, Madison county, N. Y. June, 1886. G. S. Miller, Jr.
Animal matter, 3 per cent.; vegetable, 95; gravel, etc., 2. Stomach well filled.
Contents.—Kernels of corn, oats, and a few of wheat, together with a large quantity of hulls, mainly of oats; a few small fragments of insects; 4 small pebbles, and a very little sand.

3769. Male. Immature. Peck's Island, New Jersey. July 1, 1886; noon. J. Percy Moore.
Animal matter, 15 per cent.; vegetable, 10; gravel, etc., 75. Stomach about half full.
Contents.—Mainly sand and bits of shell; two or three bits of seaweed and a very little other vegetable matter; 1 gasteropod shell about half an inch long; 3 or 4 joints of a crustacean's legs; hundreds of minute fish vertebræ, almost microscopic; about 5 per cent. of insect remains in very fine pieces.

2515. Male. Immature. Sing Sing, N. Y. July 1, 1886; 9 a. m. Dr. A. K. Fisher.
Animal matter, 99 per cent.; vegetable, 0; gravel, etc., 0; indeterminate, 1. Stomach about half full.
Contents.—Insects, mainly larvæ; a few bits of what appears to be bark or wood, but not positively identified; no sand or gravel.

2516. Male adult. Sing Sing, N. Y. July 1, 1886; 9 a. m. Dr. A. K. Fisher.
Animal matter, 2 per cent.; vegetable, 95; gravel, etc., 3. Stomach well filled.
Contents.—Nine cherry stones, with skins and pulp of about 3; fragments of corn or other grain, and the hulls of same; about 20 seeds of *Rubus* sp.? and 6 or 8 unknown seeds; a few remains of insects, apparently beetles; 5 small pebbles and a little sand.
Dr. Fisher says the cherry stones are from cherries which grow everywhere in the woods about Sing Sing, and probably have escaped from cultivation. They are very dark when ripe, almost black.

2517. Male adult. Sing Sing, N. Y. July 1, 1886; noon. Dr. A. K. Fisher.
Animal matter, 65 per cent.; vegetable, 33; gravel, etc., 2. Stomach well filled.
Contents.—Seven cherry stones (like those in No. 2516), and bits of skins and other débris of fruit; about a dozen seeds of *Rubus*, apparently the red raspberry (*R. strigosus*); large quantity of insect remains, one or two insects nearly entire; a very small amount of sand.

2518. Male adult. Sing Sing, N. Y. July 1, 1886; 1 p. m. Dr. A. K. Fisher.
Animal matter, 70 per cent.; vegetable, 30; gravel, etc., 0. Stomach full.
Contents.—Nineteen cherry stones (like those in No. 2516); a few bits of fruit skins and vegetable fiber; a very large amount of insect remains; four small vertebræ of small, tailed batrachian, perhaps a salamander (identified by F. A. Lucas).

2519. Male adult. Sing Sing, N. Y. July 2, 1886; 10.30 a. m. Dr. A. K. Fisher.
Animal matter, 60 per cent.; vegetable, 40; gravel, etc., 0. Stomach well filled.
Contents.—Six cherry stones (like those in No. 2516), and a very little other vegetable matter; bones and flesh of a small bullfrog (identified by F. A. Lucas). No trace of insects or gravel.

2520. Female adult. Sing Sing, N. Y. July 2, 1886; 1 p. m. Dr. A. K. Fisher.
Animal matter, 50 per cent.; vegetable, 50; gravel, etc., 0. Stomach little distended.
Contents.—Five stones of cherry (like those in No. 2516); remains of insects; no gravel.

2521. Female adult. Sing Sing, N. Y. July 2, 1886; 1.30 p. m. Dr. A. K. Fisher.
Animal matter, 60 per cent.; vegetable, 40; gravel, etc., 0. Stomach nearly empty.
Contents.—One cherry stone (like those found in No. 2516), and a single fragment of some other fruit stones; insect remains; no gravel.

2522. Female adult. Sing Sing, N. Y. July 2, 1886; 2.30 p. m. Dr. A. K. Fisher.
Animal matter, 33 per cent.; vegetable, 65; gravel, etc., 2. Stomach well filled.
Contents.—Four cherries, whole or nearly so, and stones of twelve more (like those in No. 2516), with a very little other vegetable matter; bones of a frog, forming about four-fifths of the animal matter, the remainder being fragments of insects; a single pebble and a very little sand.

2678. Young. Nigger Pond, Ramapo Mountains, N. J. July 4, 1886; 5 p. m. F. M. Chapman.
Animal matter, 10 per cent.; vegetable, 90; gravel, etc., 0. Stomach nearly empty.
Contents.—A few pieces of acorns, peas, or kernels of corn; three or four small berries, probably of the heath family, perhaps blueberries (*Vaccinium*); two or three pieces of animal matter, possibly bits of marine worms: two or three bones of small fish; no sand or gravel.

2679. Young. Nigger Pond, Ramapo Mountains, New Jersey. July 4, 1886; 5 p. m. F. M. Chapman.
Animal matter, 3 per cent.; vegetable, 97; gravel, etc., 0. Stomach about half full.
Contents.—Numerous fragments of the flesh of some nut, fruit or grain, not determined, perhaps of acorn, as there are many fragments of shell resembling that of an acorn; 2 pistils of flowers nearly an inch long; a few bones of small fish; no trace of insects or gravel.

2866. Male adult (?). Peterborough, Madison county, N. Y. July 14, 1886. G. S. Miller, Jr.
Animal matter, 60 per cent.; vegetable, 30; gravel, etc., 4; indeterminate, 6. Stomach well filled.

Contents.—Remains of oats (mainly the hulls); fine grass and some other vegetable fiber; bones and nearly all the teeth of a field-mouse (*Arvicola riparius*), forming about 25 per cent. of the whole stomach contents; about 30 per cent. of insect remains; about 6 per cent. of fine "mud" not identifiable.

4886. Young. Hillsborough, New Brunswick. July 15, 1886; 3 to 4 p. m. Jonathan Dwight, Jr.

Animal matter, 10 per cent.; vegetable, 45; gravel, etc., 45. Stomach nearly empty.

Contents.—Remains of seeds and berries, two kinds of seeds not recognized; remains of insects; 10 pebbles; no sand.

4887. Male, young. Hillsborough, New Brunswick. July 16, 1886; 8 a. m., Jonathan Dwight, Jr.

Animal matter, 35 per cent.; vegetable, 65; gravel, etc., 0. Stomach less than half full.

Contents.—A piece of moss about half an inch long; hulls of five or six raspberries; seven seeds of red raspberry (*Rubus strigosus*); remains of a large cutworm; no gravel or sand.

4888. Female, young. Hillsborough, New Brunswick. July 16, 1886; 8 a. m. Jonathan Dwight, jr.

Animal matter, 1 per cent.; vegetable, 99; gravel, etc., 0. Stomach less than half full.

Contents.—Hulls and a few seeds of raspberry; two small unknown pods not yet ripe; twelve or fifteen very small seeds, possibly those of strawberries; a single fragment of some beetle; no gravel or sand.

4962. Male, immature. Hillsborough, New Brunswick. July 29, 1886; 5 p. m. Jonathan Dwight, Jr.

Animal matter, 20 per cent.; vegetable, 80; gravel, etc., 0. Stomach about half full.

Contents.—A large amount of pulp and skins of some fruit not identified (the pulp looks like that of an early apple, but the skins are too thin); two stones of some species of *Prunus*, perhaps a beech plum; remains of insects, mainly (?) beetles, but one large cutworm; no gravel.

735. Immature. Sing Sing, N. Y. September 18, 1885; 10 a. m. Dr. C. Hart Merriam.

Animal matter, 5 per cent.; vegetable, 60; gravel, etc., 20; indeterminate, 15. Stomach well filled.

Contents.—Twenty-two stones of wild cherry (*Prunus serotina*); 9 of cornel (*Cornus* sp. ?), and 3 unidentified; also pulp of above berries; a few pieces of of what appears to be an acorn or chestnut; various hard parts of insects.

1540. Alfred Centre, N. Y. September 20, 1885; a. m. F. S. Place.

Animal matter, 45 per cent.; vegetable, 53; gravel, etc., 2. Stomach full.

Contents.—Fragments of the "meat" of some nut or large seed; pieces of acorns or chestnuts; numerous fragments of fruit pulp, probably apple; many insect remains (45 per cent); 5 small pebbles; no sand.

1541. Alfred Centre, N. Y. September 20, 1885; a. m. F. S. Place.

Animal matter, 40 per cent.; vegetable, 60; gravel, etc., 0. Stomach full.

Contents.—Seven stones of wild cherry (*Prunus serotina*); 5 or 6 triangular seeds (of *Polygonum?*) skins and other vegetable matter from both the preceding, and some long vegetable fiber from some other plant; numerous insect remains; no sand or gravel.

2239. Male. Washington, D. C. September 7, 1886; 11 a. m. W. B. Barrows.

Animal matter, 0 per cent.; vegetable, 70; gravel, etc., 5; indeterminate, 25. stomach almost empty.

Contents.—One grape seed; vegetable fiber finely divided; 2 or 3 bits of sand and gravel; fine mud-like material, not identifiable; no insects.

1. *White-throated Sparrow.* 2. *Towhee.*
3. *White-crowned Sparrow.* 4. *Water Thrush.*

Males.

2240. Male. Washington, D. C. September 7, 1886; 11 a. m. F. A. Lucas.
Animal matter, 10 per cent; vegetable, 80; gravel, etc., 10. Stomach about half full.
Contents.—Grape seeds and skins, with a little pulp and much vegetable fiber; other vegetable material not identifiable; 7 seeds of poison ivy; small amount of gravel; a few insect remains.
The grape seeds are undoubtedly those of cultivated grapes, as this bird and No. 2239 were shot near a vineyard, the owner of which complained of the great damage done by the crows.

2698. Alfred Centre, N. Y. September 7, 1886. F. S. Place.
Animal matter, 95 per cent.; vegetable, 5; gravel, etc., 0. Stomach less than half full.
Contents.—One stone of wild cherry and a very little fine vegetable matter, probably from the fruit of the same; several grasshoppers and perhaps other insects; no gravel.

2242. Male. Shelter Island, New York. September 11, 1886; a. m. W. W. Worthington.
Animal matter, 10 per cent., vegetable, 85; gravel, etc., 5. Stomach well filled.
Contents.—About 50 seeds of bay-berry or wax-berry (*Myrica cerifera*); hulls of corn or some other grain, with a few small bits of the grain; a little fine vegetable material, not identified; remains of the legs of a small crustacean; 4 small snail shells (marine); 2 vertebræ of small fish; a few fragments of insects; a little sand.

4587. Male. Shelter Island, New York. October 1, 1886; a. m. W. W. Worthington.
Animal matter, 25 per cent.; vegetable, 60; gravel, etc., 15. Stomach about half full.
Contents.—Fragments of acorns or chestnuts, and, perhaps of some other seeds, but these mainly; remains of a crayfish; 4 or 5 minute bits of an insect; considerable sand, but no pebbles.

4588. Male. Shelter Island, New York. October 1, 1886; a. m. W. W. Worthington.
Animal matter, 0 per cent.; vegetable, 100; gravel, etc., 0. Stomach less than half full.
Contents.—Remains of a dozen or more kernels of corn; about 50 stones of bay-berry (*Myrica cerifera*); a single stone of some wild *Prunus*, probably the beech plum (*P. maritima*); 3 small claw tips of a crab or crayfish, probably taken as gravel (?); no insects.

2269. Female, adult. Sing Sing, N. Y. October 2, 1886; 3 p. m. Dr. A. K. Fisher.
Animal matter, 2 per cent.; vegetable, 95; gravel, etc., 3. Stomach full.
Contents.—Nineteen seeds of flowering dogwood (*Cornus florida*); 17 seeds of bay-berry (*Myrica cerifera*); bits of shell of chestnuts and large amount of chestnut "meat;" 8 vertebræ and other small bones of a small fish; minute bits of the shell of insects; little sand and gravel.

1439. Essex Junction, Vt. October 3, 1885; 10 a. m. Charles A. Davis.
Animal matter, 1 per cent.; vegetable, 10; gravel, etc., 89. Stomach nearly empty.
Contents.—Skin and pulp of a single fruit, perhaps a grape, but no seeds; large quantity of sand and gravel; minute fragments of the hard parts of insects.

1444. Winfield N. Y. October 4, 1885; a. m. O. P. Hitchings.
Animal matter, 5 per cent.; vegetable, 5; gravel, etc., 85; indeterminate, 5.
Contents.—A few bits of oats and perhaps other grain; a mixture of finely pulverized vegetable and mineral matter, forming a fine black mud; a large amount of sand and pebbles; a few fragments of insects.

2564. Female. Broadway, Queens county, N. Y. October 16, 1886; noon. William Dutcher.
Animal matter, 18 per cent; vegetable, 75; gravel, etc., 7. Stomach well filled.
Contents.—Remains of acorns or chestnuts; remains of insects; gravel, including many bits of shell.

1141. Adult. Sing Sing, N. Y. October 18, 1885. Dr. A. K. Fisher.
Animal matter, 10 per cent.; vegetable. 75; gravel, etc., 10; indeterminate, 5. Stomach well filled.
Contents.—Fragments of acorns or chestnuts; about 50 seeds of poison sumach; remains of various insects; skin and pulp of a few berries.

1515. Watkins, N. Y. October 20, 1885; 8.45 a. m. H. C. Griswold.
Animal matter, 25 per cent.; vegetable, 25; gravel, etc., 50. Stomach about half full.
Contents.—Fragments of seeds, one of which appears to be that of a squash or melon; a little unidentifiable vegetable matter; remains of insects; sand and gravel.

3940. Male. Rockville, Conn. October 22, 1886. H. K. James.
Animal matter, 60 per cent.; vegetable, 35: gravel, etc., 5. Stomach full.
Contents.—Remains of some large seed, possibly corn or beans of some kind; large quantity of insect remains, mainly grasshoppers; small quantity of gravel, mostly bits of quartz, but one fair-sized garnet.

4080. Male. East Hartford, Conn. October 22, 1886; noon. C. C. Hanmer.
Animal matter, 2 per cent.; vegetable, 96; gravel, etc., 2. Stomach full.
Contents.—Remains of acorns or chestnuts almost entirely, and mainly without any bits of shell; a small amount of insect fragments in very small bits; a few pieces of charcoal, and a very little sand.

1460. Male. Redford, Mich. October 26, 1885; 7 a. m. (Killed over corn-field.) William J. Muldragh.
Animal matter, 0 per cent.; vegetable, 99; gravel, etc., 1. Stomach about half full.
Contents.—Mainly fragments of the pulp or flesh of some nut or berry, possibly acorns; 2 grape seeds; 3 small pebbles, no sand; no insect remains; no traces of corn.

1201. Male. Washington, D. C. October 30, 1885; 4 p. m. Dr. C. Hart Merriam.
Animal matter, trace; vegetable, 89 per cent.; gravel, etc., 5; indeterminate, 5. Stomach well filled.
Contents.—Twenty or thirty kernels of corn in fragments; 21 stones of flowering dogwood (*Cornus florida*): 125 seeds of poison ivy; sand and gravel; and what appears to be fine mud; no trace of insect remains.

1202. Female. Washington, D. C. October 30, 1885; 4 p. m. Dr. C. Hart Merriam.
Animal matter, 1 per cent.; vegetable, 94; gravel, etc., 5. Stomach full.
Contents.—About 40 seeds of Virginia creeper (*Ampelopsis quinquefolia*); about 50 seeds of grapes (*Vitis*), at least 2 species; about 20 seeds of poison ivy, 1 of poison sumach, and 30 more unidentified; pulps and skins of grapes and other fruit; bits of sea-weed, grass, and unrecognizable vegetable matter; a few bits of insects; sand, gravel, 2 or 3 bits of mollusk shell, and single, worn claw of crayfish.

1250. Female. Washington, D. C. November 14, 1885; 11.30 a. m. Dr. A. K. Fisher.
Animal matter, 8 per cent.; vegetable, 90; gravel, etc., 2. Stomach full.
Contents.—Nine seeds of Virginia creeper (*Ampelopsis*); 12 stones of flowering dogwood (*Cornus florida*); fragments of about 5 kernels of corn; a few hairs of a small mammal (probably mouse); 1 very small gasteropod shell; bones of the head of a small fish; minute fragments of one insect.

2301. Adult. Washington, D. C. November 7, 1886; 4.30 p. m. H. W. Henshaw.
Animal matter, 10 per cent.; vegetable, 65; gravel, etc., 20; indeterminate, 5. Stomach full.

Contents.—Remains of acorns, chestnuts, and perhaps other seeds; a single grape seed, and some hulls of corn or other grain, with much fine vegetable matter like saw-dust; a considerable amount of sand and gravel; remains (fine) of many insects.

1709. Male. Calhoun, Ga. November 28, 1885. R. Windsor Smith.
Animal matter. 75 per cent.; vegetable, 10; gravel, etc., 15.
Contents.—Twenty-four seeds of poison ivy; a small snake, 8 inches or more in length; a small snail (*Helix*); 1 very large spider; remains of many insects, constituting almost 40 per cent. of entire stomach contents; 4 or 5 pebbles of the size of kernels of corn, and some sand; a very little undetermined vegetable matter.

1518. Male. Watkins, N. Y. December 15, 1885; 4 p. m. H. C. Griswold.
Animal matter, 12 per cent.; vegetable, 63; gravel, etc., 25. Stomach full.
Contents.—Remains of corn, acorns, or chestnuts; some other seeds too much comminuted to determine; numerous insect remains; large quantity of gravel.

4600. Male. Rockaway Beach, Long Island, N. Y. December 17, 1885. Jonathan Dwight, jr.
Animal matter, 95 per cent.; vegetable, 0; gravel, etc., 5. Stomach nearly empty.
Contents.—The animal matter of one or more shell-fish (apparently a mussel and a barnacle, as bits of shell belonging to these are also contained); a very little sand; no insects.

1269. Female. Washington, D. C. December 2, 1885; 4 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 75; gravel, etc., 20; indeterminate, 4.
Contents.—Fragments of 1 or 2 acorns or chestnuts; large quantities of the "skin" or hulls of grain, apparently of kernels of corn; 30 seeds of poison ivy; large amount of sand and gravel; some vegetable fiber and mud; numerous but small fragments of the hard parts of insects.

1297. Female. Washington, D. C. December 17, 1885; found dead. Dr. A. K. Fisher.
Animal matter, 90 per cent.; vegetable, 2; gravel, etc., 8. Stomach about one-fourth full.
Contents.—One cocoon of some insect, and 2 smaller cocoons, or egg-bags of spider; 12 or 15 small fragments of much-worn bone, perhaps taken as "gravel;" a few bits of vegetable membrane, apparently epidermis of some grain; a very small amount of sand and gravel.

1298. Washington, D. C. December 17, 1885; found wounded. Dr. A. K. Fisher.
Animal matter, 5 per cent.; vegetable, 85; gravel, etc., 8; indeterminate, 2.
Contents.—Remains of 3 or 4 kernels of corn and the hulls of many more; 90 to 100 seeds of common sumach, apparently *Rhus glabra;* fragments of insects; gravel and sand; about 2 per cent. of fine mud-like material, not determined.

1299. Female. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 80; gravel, etc., 19. Stomach well filled.
Contents.—Seven seeds of harmless sumach; a large amount of vegetable matter, part of which may be bits of corn, acorns, etc., but the bulk seems more like sea-weed; a few fragments of the hard parts of insects; a large amount of gravel and fine sand, with 2 or 3 bits of shell.

1300. Male. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 0 per cent.; vegetable, 90; gravel, etc., 10. Stomach well filled.
Contents.—Fragments of corn; 75 seeds of poison ivy; 60 seeds of common sumach and 1 seed of grape; gravel and bits of coal and brick; no insect remains.

1301. Male. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, trace; vegetable, 75 per cent.; gravel, etc., 24. Stomach well filled.
Contents.—"Mast" (*i. e.*, acorns, chestnuts and similar material), and large quantities of the epidermis of some grain, perhaps corn; 68 seeds of poison ivy; large amount of sand, gravel, etc.; minute fragments of insects.

1302. Male. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 85; gravel, etc., 14. Stomach well filled.
Contents.—Fragments of many kernels of corn, and two entire kernels; about 15 seeds of common sumach; 30 seeds of poison ivy; sand, gravel, and 5 or 6 good-sized bits of mother-of-pearl; a few small fragments of insects, and one insect nearly entire.

1303. Female. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter 1 per cent.; vegetable, 94; gravel, etc., 5. Stomach well filled.
Contents.—About 20 whole kernels of corn, and fragments of as many more; 7 seeds of grape; about 60 seeds of common sumach; 5 seeds of poison ivy; gravel, coal and sand; a few remains of insects.

1304. Male. Washington, D. C. December 19, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 5 per cent.; vegetable, 70; gravel, etc., 25. Stomach about two-thirds full.
Contents.—About 10 entire kernels of corn (without skins), and as much more in fragments; 2 seeds of poison ivy; gravel, and bits of coal; about 5 per cent. of insect remains.

1311. Male. Washington, D. C. December 23, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 10 per cent.; vegetable, 60; gravel, etc., 30. Stomach full.
Contents.—Particles of wheat or corn, 3 or 4 kernels in all; 100 seeds of common sumach; remains of sea-weeds and other vegetable matter; remains of a few small crustaceans (perhaps isopods); fragments of mussel shell with parts of the mussel attached; minute pieces of insects; considerable sand, and many pebbles.

1312. Male. Washington, D. C. December 23, 1885; 4–5 p. m. Dr. A. K. Fisher.
Animal matter, 40 per cent.; vegetable, 50; gravel, etc., 10. Stomach full.
Contents.—One kernel of corn nearly entire, pieces of several more, and a large amount of hulls and other vegetable débris; 20 or 25 seeds of harmless sumach, apparently of two species; remains of a small crab or crayfish; 10 or 12 small bones of a fish; numerous remains of insects (grasshopper legs, etc.), and pieces of myriapods; sand, gravel, and pebbles, with 1 or 2 bits of shell.

1313. Male. Washington, D. C. December 23, 1885; 4–5 p. m. H. W. Henshaw.
Animal matter, 1 per cent.; vegetable, 15; gravel, etc., 70; indeterminate, 14. Stomach full.
Contents.—Seeds and gravel mainly, with a little mud and fine vegetable refuse; traces of insects in addition to 2 or 3 small beetles entire; about forty seeds of common sumach, and about 80 of poison ivy; a few small bits of some grain, in all equal to about two kernels of wheat. Among the gravel was a small, worn, crayfish claw.

1314. Male. Washington, D. C. December 23, 1885; 4–5 p. m. H. W. Henshaw.
Animal matter, 10 per cent.; vegetable, 60; gravel, etc., 30. Stomach full.
Contents.—Pieces of corn, perhaps 4 or 5 kernels in all; bits of grass, hulls, vegetable fiber of various kinds, and considerable fine "mud," apparently all vegetable; 6 or 8 pieces of the carapace of a crayfish; fragments of mussel shell (*Unio*?); many small bones of common mouse (*Mus musculus*), with some of the teeth; many fragments of insects, much comminuted; sand, gravel, charcoal, and one or two imperfect snail shells.

1315. Male. Washington, D. C. December 23, 1885; 4–5 p. m. H. W. Henshaw.
Animal matter, 1 per cent.; vegetable, 97; gravel, etc., 2. Stomach well filled.

1. *Northern Shrike.* 2. *Yellow-breasted Chat.*
3. *Loggerhead Shrike.* 4. *Gray-cheeked Thrush.*

Contents.—Mainly kernels of corn whole or in fragments, and the hulls of same; bits of the shell of acorns and a few bits of the kernel of same; 4 seeds of poison ivy; 1 seed of bind-weed (*Polygonum?*); about 100 very small, black seeds; a very few fragments of insects; a very little gravel or sand.

1316. Female. Washington, D. C. December 23, 1885; 4–5 p. m. H. W. Henshaw.
Animal matter, 3 per cent.; vegetable, 72; gravel, etc., 25. Stomach about half full.
Contents.—A few bits of corn and hulls of same; pieces of grass and very fine vegetable débris, part of it apparently the shell of some bony seed; 4 or 5 small beetles, and minute portions of hard parts of others; sand and gravel; small tuft of mammal's hair, probably of cat or dog; fragments of one or more legs of crayfish; eight or ten kernels of wild rice (*Zizania aquatica*); 2 unknown seeds.

1317. Female. Washington, D. C. December 23, 1885; 4–5 p. m. H. W. Henshaw.
Animal matter, 2 per cent.; vegetable, 83; gravel, etc., 15. Stomach about three-fourths full.
Contents.—Mainly pieces of corn and hulls of same; 123 seeds of poison ivy; a little fine vegetable matter not determined; minute pieces of the hard parts of insects; gravel and fine sand form about 15 per cent. of the entire contents.

2528. Male. Washington, D. C. December 25, 1886. F. A. Lucas.
Animal matter, 5 per cent.; vegetable, 50; gravel, etc., 25; indeterminate, 20. Stomach well filled.
Contents.—Remains of acorns, chestnuts, and similar material, in small pieces; about 20 per cent. of other vegetable material, similar in color, but like fine mud, and probably part vegetable and part sand; bones of a small fish, forming 4 or 5 per cent. of contents; a single leg of some insect, and 2 or 3 other minute insect fragments; gravel, consisting mainly of mother-of-pearl and fine sand.

4117. Female. East Hartford, Conn. December 15, 1886; 10 a. m. C. C. Hanmer.
Animal matter, 15 per cent.; vegetable, 60; gravel, etc., 20; indeterminate, 5. Stomach well filled.
Contents.—Remains of acorns, both shells and "meat;" a few bits of thorn-apple (*Cratægus*) but no seeds; bits of grass and finally divided vegetable matter; a considerable amount of fine, dark hair, probably of mouse; perhaps 5 per cent. of insect remains; a large amount of pebbles and sand; about 5 per cent. of fine "mud" not determined.

Results in Details of the Examination of Stomachs of the Fish Crow (*Corvus ossifragus*).

1332. Male. Washington, D. C. March 16, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 5 per cent.; vegetable, 93; gravel, etc., 2. Stomach full.
Contents.—Eleven seeds of cat-brier (*Smilax glauca*); 2 seeds of sour gum (*Nyssa multiflora*); a few bits of corn and many hulls, together with other fibrous vegetable matter; 2 small masses of animal fiber, apparently flesh of some mammal; single feather, probably of chicken; a very little sand, etc.; no insect remains.

1333. Female. Washington, D. C. March 16, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 10 per cent.; vegetable, 88; gravel, etc., 2. Stomach about half full.
Contents.—Two or three kernels of corn, and hulls of more, with some other vegetable matter; bone of some mammal (probably taken with gravel); 2 or 3 feathers, kind not determined; among the gravel was a bit of shell (of *Unio?*) and several bits of egg-shell (hen's); no insects.

1334. Female. Washington, D. C. March 16, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 98 per cent.; vegetable, trace; gravel, etc., 2. Stomach about one-third full.
Contents.—A mass of meat and sinews, doubtless carrion; a very few small bits of coal and sand, and one or two bits of egg-shell (hen's); a very few vegetable fibers, perhaps of grass; no insects.

1335. Male, Washingten, D. C. March 16, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 75 per cent.; vegetable, 5; gravel, etc., 20. Stomach about one-third full.
Contents.—Shreds of meat, and strips and small sheets of animal membrane; not identifiable, doubtless carrion; a few bits of grass and woody fiber; particles of sand and pebbles, and numerous small pieces of egg shell (hens), together with fragments of a mussel shell (*Unio?*), and 2 small bones, apparently mammalian, but discolored and probably taken as gravel; no insects.

1336. Washington, D. C. March 16, 1886; 4 p. m. Dr. A. K. Fisher.
Animal matter, 5 per cent.; vegetable, 75; gravel, etc., 5; indeterminate, 15. Stomach about half full.
Contents.—Mainly remnants of oats with the hulls, and corn in fine pieces; a little meat fiber; a few downy feathers; 3 or four unknown seeds; some sand and gravel and bits of egg shell (hen's); no insects.

657. Female. Immature. Sing Sing, N. Y. September 10, 1885; 6.30 a. m. Dr. A. K. Fisher.
Animal matter, 0; vegetable, 100. Stomach half full.
Contents.—Fragments of oats, pieces of acorns or chestnuts; unrecognizable vegetable matter; no traces of animal matter.

2529. Male. Washington, D. C., November 1, 1886. F. A. Lucas.
Animal matter, 10 per cent.; vegetable, 90; gravel, etc., 0. Stomach about two-thirds full.
Contents.—Seeds, pulp, and skins of about 20 poke-berries (*Phytolacca decandra*); remains of two or three grasshoppers, and perhaps other insects; no gravel.

2284. Male. Washington, D. C., November 1, 1886; 3 p. m. F. A. Lucas.
Animal matter, 65 per cent.; vegetable, 30; gravel, etc., 5. Stomach well filled.
Contents.—Five grape seeds, pieces of grape skins, many fragments of grasshoppers (and other insects?), a little sand, bits of egg shell, one scale from shell of tortoise, probably all taken as gravel.

2302. Female. Washington, D. C., November 7, 1886; 4.30 p. m. H. W. Henshaw,
Animal matter, 35 per cent.; vegetable, 65; gravel, etc., 0. Stomach well filled.
Contents.—Seeds and skins of about 20 small grapes, apparently "frostgrapes" (*Vitis cordifolia*); about 130 seeds of poke-berry (*Phytolacca*); heads, wings, and legs of several grasshoppers; no gravel or sand except one small piece of mica.

2583. Male. Washington, D. C., November 19, 1886; 9.30 a. m. William Dutcher.
Animal matter, 50 per cent.; vegetable, 50; gravel, etc., 0. Stomach nearly empty.
Contents.—Three seeds of poke-berry and one or more skins of same; 3 seeds of red cedar (*Juniperus virginiana*); no insect remains; no gravel.

1310. Male. Washington, D. C. December 23, 1885; 4–05 p. m. Dr. A. K. Fisher.
Animal matter, 1 per cent.; vegetable, 96: gravel, etc., 3. Stomach about half full.
Contents.—Two or three grains of wheat, and many fragments of this or other grain; 2 seeds of Virginia juniper; many fragments of some black, bony seed, looking much like ground coffee; 2 or 3 small "pin feathers" still inclosed in the sheath except at tip; many small fragments of egg-shell (hen's); a very little sand, and 1 bit of stone; no trace of insect remains.

1, 2. Black-throated Blue Warbler, Male and Female.
3. Black-throated Green Warbler. 4. Parula Warbler, Males.

318. Female. Washington, D. C. December 25, 1885; 4-05 p. m. Dr. A. K. Fisher. Animal matter, 50 per cent.; vegetable, 50; gravel, etc., 0.
Contents.—Meat (probably carrion); 8 seeds of sour gum (*Nyssa multiflora*); 4 seeds of flowering dogwood, 1 seed of grape, 5 seeds of hackberry (*Celtis occidentalis*); 2 unknown seeds; no gravel or insect remains.

THE ENGLISH SPARROW.

[Extracts from Bulletin No. 1, U. S. Department of Agriculture, Division of Economic Ornithology and Mammalogy. Prepared under the direction of Dr. C. HART MERRIAM, Ornithologist, by WALTER B. BARROWS, Assistant Ornithologist.]

RELATION OF THE SPARROW TO OTHER BIRDS.

This is one of the most important branches of the sparrow investigation, and it is believed that the evidence collected and published herewith is ample for the final settlement of this much vexed question. More than a thousand original contributions to our knowledge of this subject have been received at the department, and all the available published testimony has also been consulted, and selections from this have been printed. No pains have been spared in collecting evidence on both sides of the question; and when it became apparent that a large part of the testimony which was coming in was against the sparrow, a special effort was made to induce friends of the bird to come forward with facts or theories to offset this damaging evidence. As a result, a mass of testimony has been brought together which it is believed far exceeds in amount and value anything ever before collected, and it is now submitted to the public with perfect confidence that no candid reader will ever again deny that the sparrow molests our native birds, and in many cases drives them away from our gardens and parks. No one should be content to read simply the brief summary presented at this place, but should turn directly to the evidence itself, and satisfy himself that the case is as here represented.

The nature of the evidence is such that it is impossible to summarize it satisfactorily, but the following brief synopsis of matter contributed directly to the department will show something of its extent:

Total number of original reports submitted	1,048
In the main favorable to the sparrow	168
In the main unfavorable to the sparrow	837
Indeterminate	43

This would indicate that about one-fifth of the evidence submitted is favorable to the sparrow; but if we exclude from the evidence all of those reports which consist simply of the answers yes or no to the questions asked on the printed circulars, the percentage of favorable replies will be still further decreased.

Two hundred and eighty-one reports were received which gave little or no evidence on this subject further than these monosyllabic replies, while the seven hundred and sixty-seven remaining reports gave illustrations of the hostile or peaceful relations of the birds, or at least mentioned some species which were not molested.

Of these seven hundred and sixty-seven reports only forty-two are entirely, or even mainly, favorable to the sparrow; seven hundred and twenty-five of them containing evidence unquestionably against the sparrow, and most of it of the most damaging kind.

This estimate, therefore, which seems to us much nearer the truth than the first, shows that about one-eighteenth of the reports received are favorable to the sparrow as regards its relation to other birds, but it should not be inferred by any means that, therefore, even one-eighteenth of the evidence is favorable.

About one witness in eighteen has testified for the sparrow, but each juror must decide for himself as to the weight to be given to each piece of evidence. For our own part, after careful consideration of each bit of testimony presented, we believe that the proportion of one hundred to one against the sparrow is the most favorable estimate which any unprejudiced person is likely to make.

List of Native Birds Molested by the Sparrow.

The following table gives the names of species which the sparrow is reported to molest, and the number of such reports in each case:

	Reports
Bluebird (*Sialia sialis*)	377
*Western bluebird (*Sialia mexicana*)	1
Robin (*Merula migratoria*)	182
Hermit thrush (*Turdus aonalaschkæ pallasii*)	1
Wood thrush (*Turdus mustelinus*)	4
Thrushes, species not indicated	14
Golden-crowned kinglet (*Regulus satrapa*)	3
Chickadee (*Parus atricapillus*)	1
Titmouse, species not indicated	4
Tomtit, species not indicated	1
White-bellied nuthatch (*Sitta carolinensis*)	1
Nuthatch, species not indicated	1
House wren (*Troglodytes ædon*)	64
*Parkman's wren (*Troglodytes ædon parkmanni*)	1
Carolina wren (*Thryothorus ludovicianus*)	6
Bewick's wren (*Thryothorus bewickii*)	2
Wren, species not indicated	116
Brown thrasher (*Harporhynchus rufus*)	8
Catbird (*Galeoscoptes carolinensis*)	33
Mockingbird (*Mimus polyglottos*)	50
Redstart (*Setophaga ruticilla*)	1
Yellow warbler (*Dendroica æstiva*)	11
Myrtle warbler (*Dendroica cononata*)	1
Warblers, species not indicated	15
Red-eyed vireo (*Vireo olivaceus*)	2
Warbling vireo (*Vireo gilvus*)	3
White-eyed vireo (*Vireo noveboracensis*)	1
Vireos, species not indicated	9
Cedar bird, cherry bird (*Ampelis cedrorum*)	4
Purple martin, black martin (*Progne subis*)	65
Martins, species not indicated	198
Cliff swallow, mud swallow (*Petrochelidon lunifrons*)	25
Barn swallow (*Chelidon erythrogaster*)	24
White-bellied swallow, blue-backed swallow (*Tachycineta bicolor*)	40
*Violet-green swallow (*Tachycineta thalassina*)	1
Bank swallow (*Clivicola riparia*)	2
Rough-winged swallow (*Stelgidopteryx serripennis*)	1
Swallows, species not indicated	84
Tanager, species not indicated	1
Indigo bird (*Passerina cyanea*)	5
*Painted finch, nonpareil (*Passerina ciris*)	2
Grosbeaks, species not indicated	1
Cardinal (*Cardinalis cardinalis*)	1
Red bird, species not indicated	11
Brown towhee, species not indicated	1
Chewink (*Pipilo erythrophthalmus*)	1
Song sparrow (*Melospiza fasciata*)	26
Chipping sparrow, chippy (*Spizella socialis*)	72
Field sparrow (*Spizella pusilla*)	2
Tree sparrow (*Spizella monticola*)	5
Common sparrow, species not indicated	19
Native sparrow, species not indicated	16
Ground sparrow, species not indicated	7
Other sparrows, species not indicated	39
Savanna sparrow (*Ammodramus sandwichensis savanna*)	
Grass finch, vesper sparrow (*Poocætes gramineus*)	2
Grass bird, species not indicated	1
Snowbirds (*Junco sp.?*)	13
Gold Finch, Yellow-bird, Wild canary (*Spinus tristis*)	32
*Arkansas goldfinch (*Spinus psaltria*)	1
Red-poll (*Acanthis linaria*)	1
Purple finch (*Carpodacus purpureus*)	5
House finch (*Carpodacus frontalis*)	3
Other finches, species not indicated	4
Linnet, species not indicated	1
Purple grackle (*Quiscalus quiscula*)	2
Grackles, species not indicated	5
Baltimore oriole (*Icterus galbula*)	37
Orchard oriole (*Icterus spurius*)	4
Orioles, species not indicated	10
Meadow-lark (*Sturnella magna*)	3
Red-winged blackbird (*Agelaius phœniceus*)	1
Blackbirds, species not indicated	8
Bobolink (*Dolichonyx oryzivorus*)	5
Shore lark (*Otocoris alpestris*)	1
Blue jay, jay (*Cyanocitta cristata*)	36
Crows, species not indicated	5
Least pewee (*Empidonax minimus*)	3
Wood pewee (*Contopus virens*)	1
Phœbe (*Sayornis phœbe*)	28
Great crested fly-catcher (*Myiarchus crinitus*)	1
Kingbird, Bee martin, Bee-bird (*Tyrannus tyrannus*)	17
Flycatchers, species not indicated	8
Insectivorous birds, species not indicated	5
Song birds, species not indicated	31
Hummingbird (*Trochilus colubris*)	1
Chimney swallow or swift (*Chætura pelagica*)	3
Red-headed woodpecker (*Melanerpes erythrocephalus*)	3
Yellow-bellied woodpecker (*Sphyrapicus varius*)	1
Sapsucker, species not indicated	2
Downy woodpecker (*Dryobates pubescens*)	8
Hairy woodpecker (*Dryobates villosus*)	1
Goldenwinged woodpecker flicker (*Colaptes auratus*)	3
Woodpeckers, species not indicated	6
Yellow-billed cuckoo (*Coccyzus americanus*)	1

In addition to the birds specifically mentioned in the foregoing list, many other reports have been received alleging attacks on birds, but not mentioning the species so molested. Thus sixty-five reports mentioned molestation of "native birds;" forty-eight reports speak of "other birds" being driven off; seventy-eight reports state that the sparrow molests or drives off "nearly all species;" twenty-eight claim a similar effect on "all small birds;" five claim the same for "yard birds," and two for "domestic birds."

* Indicates species not found in Pennsylvania.—B. H. Warren.

Ten observers report attacks upon domesticated doves or pigeons, and one each on hens and chickens.

It will thus be seen that the reports mention specifically seventy kinds of wild birds which are known to be molested more or less by the sparrow. A majority of these birds are species which nest about houses and gardens, and, with the exception of the crow, jay, and possibly one or two others, all are decidedly beneficial to the farmer and gardener.

Naturally the birds most affected are those whose nesting habits are similar to those of the sparrow; that is, which nest mainly in boxes provided for them; in cavities or cornices of buildings; under the eaves of barns or outhouses, or in the natural cavities of trees.

Thus, in a total of about 1,860 complaints, we find that more than half relate to martins, swallows, wrens and bluebirds, whose nests or nesting places are coveted by the sparrow.

But in most places the sparrows since outgrew such accommodations and were compelled to build nests among the branches of trees, like other birds; and at once such bulky nests as those of the robin, catbird, etc., were seized upon and utilized either as building material or as foundation for new nests. Thus new quarrels have been continually originating, and the sparrow has been steadily encroaching on the territory of other birds. Although a large part of the trouble with native birds has doubtless arisen from questions over nesting places, still there is abundance of testimony that the sparrow molests birds under other circumstances.

Nearly one-third of all the complaints of injury to other birds relate to species whose nesting and food habits are very different from those of the sparrow, and whose relations with this bird might reasonably be expected to be peaceful and pleasant. Among such may be mentioned the mockingbird, chipping sparrow, song sparrow, goldfinch, Baltimore oriole, yellow warbler and vireos. Of course many of these birds, as well as those previously mentioned, offer more or less resistance to the advances of the sparrow, but in most cases the resistance is useless and the native birds are compelled to retire from the field sooner or later.

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1. Hooded Warbler. *2. Myrtle Warbler.*
3. Kentucky Warbler. *4. Blackburnian Warbler.*

Males.

CONTENTS OF STOMACHS OF ENGLISH SPARROWS (*Passer domesticus*).

[Examined at West Chester, Pa., by Dr. B. H. Warren, Prof. C. B. Cochran and Benj. M. Everhart.]

Catalogue number.	Age.	Date of capture.	Locality.	CEREALS.			Fruit and fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Buds and blossoms.	Insect food.	Remarks.
				Wheat.	Oats.	Corn (maize).								
		1879.												
1	Adult.	Mar. 13,	Chester co., Pa.,					*						
2	do.	Mar. —,	do.					*						Clover seed.
3	do.	do.	do.	*				*						do.
4	do.	do.	do.	*				*		*				Blades of grass.
5	do.	do.	do.					*						Clover seed.
6	do.	do.	do.	*				*						do.
7	do.	do.	do.					*						Blades of grass.
8	do.	do.	do.					*		*				Clover seed.
9	do.	do.	do.					*		*				do.
10	do.	do.	do.	*						*				Small black seed.
		1880.												
11	do.	Mar. 1,	do.			*				*				White corn and small seed.
12	do.	Mar. 3,	do.	*						*			1 beetle.	Few small black seeds.
13		do.	do.	*						*	*			Green vegetable matter.
14	Adult.	do.	do.						*			*		Blossoms of pear; seed of bitter-weed.
15	do.	do.	do.	*								*		
16	do.	Mar. 4,	do.							*		*		Small seeds.
17	do.	Mar. 12,	do.			*				*				
18	do.	Mar. 15,	do.	*										
19	do.	Mar. 22,	do.	*										
20		Mar. 5,	do.	*						*				
21		Mar. 6,	do.							*	*			Small black seeds.
22		do.	do.							*				Small seeds.
23		Mar. 20,	do.							*				Small seeds and blades of grass.
		1879.												
24		Apr. 3,	do.	*					*					Seeds of bitter weed.
25		Apr. 5,	do.							*		*		Small seeds.
26		Apr. 9,	do.							*				do.
27		Apr. 25,	do.			*								White corn.
28		do.	do.									*		Buds of pear.
29		Apr. 26,	do.	*										Clover seed.
30		Apr. 30,	do.	*										Buds of haw tree.
31		do.	do.	*						*				Small black seeds.
		1880.												
32		Apr. 17,	do.								*			
33		Apr. 20,	do.									*		Seeds.
34		Apr. 23,	do.							*		*		Small black seeds.
35		Apr. 27,	do.			*						*		
36		do.	do.	*		*								White corn.
37		do.	West Chester, Pa.,							*		*		Small seeds.
38		Apr. 29,	do.							*		*		Small black seeds.
39		May 6,	do.		*									
40		do.	do.		*									
41		do.	do.		*									
42		do.	do.		*									
43		May 7,	do.							*		*		Buds of haw tree; few black seeds.
44		May 8,	do.		*									
45		do.	do.		*									
46		do.	do.		*									
47		do.	do.		*									
48		do.	do.		*									
49		do.	do.		*									
50		do.	do.		*									
51		do.	do.		*									
52		May 9,	do.		*									
53		do.	do.		*									
54		do.	do.		*									
55		May 20,	do.								*			Rye bread.
56		do.	do.								*			do.
57		do.	do.			*								White corn.
58	Young.	May 23,	do.										Apterous insects.	
59		May 25,	do.		*									
60		May 29,	do.		*									
61		do.	do.		*					*				
62		do.	do.		*					*				

CONTENTS OF STOMACHS OF ENGLISH SPARROWS—*Continued.*

Catalogue number.	Age.	Date of capture.	Locality.	CEREALS.			Fruit and fruit seed.	Grass seed.	Weed seed.	Undetermined vegetable matter.	Bread, rice, etc.	Buds and blossoms.	Insect food.	Remarks.
				Wheat.	Oats.	Corn (maize).								
		1880.												
63	. . . . .	May 29,	West Chester, Pa.,	. .	*	. .	. .	. .	. .	*	. .	. .	. . . . .	
64	. . . . .	do.	do.	. .	*									
		1879.												
65	. . . . .	June 8,	do.	. .	. .	. .	. .	. .	. .	. .	*			
66	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	Stomach empty.
67	. . . . .	June 20,	do.	*	*									
68	Adult, .	June 15,	do.	. .	. .	. .	. .	. .	. .	*	*	. .	. . . . .	Ginger-bread and green vegetable matter.
69	Young.	do.	do.	. .	. .	. .	. .	. .	. .	. .	*	. .	. . . . .	Ginger-bread.
		1880.												
70	. . . . .	Sept. 4,	do.	. .	. .	. .	. .	. .	. .	*	*	. .	. . . . .	Green leaves.
71	. . . . .	Sept. 5,	do.	. .	*									
72	. . . . .	do.	do.	. .	*									
73	. . . . .	Sept. 7,	do.	. .	*									
74	. . . . .	Sept. 13,	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	1 potato beetle.	
75	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	Flies.	
76	. . . . .	Sept. 22,	do.	. .	. .	. .	. .	. .	. .	. .	*			
77	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	*			
78	. . . . .	do.	do.	. .	. .	. .	. .	*	. .	. .	. .	. .	. . . . .	Seed of fox-tail grass.
79	. . . . .	do.	do.	. .	. .	. .	. .	*	. .	. .	. .	. .	. . . . .	do.
80	. . . . .	do.	do.	. .	. .	. .	. .	*	. .	. .	. .	. .	. . . . .	do.
81	. . . . .	Oct. 14,	do.	. .	*									
82	. . . . .	Oct. 15,	do.	. .	*									
83	. . . . .	Nov. 13.	do.	. .	. .	. .	. .	. .	. .	. .	*			
84	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	*			
85	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	*			
86	. . . . .	Nov. 17,	do.	. .	*									
87	. . . . .	do.	do.	. .	*									
88	. . . . .	do.	do.	. .	*									
89	. . . . .	do.	do.	. .	*	*								
90	. . . . .	do.	do.	. .	*									
91	. . . . .	Dec. 2,	do.	. .	. .	*								
92	. . . . .	Dec. 9,	do.	. .	*	. .	. .	. .	. .	. .	. .	. .	. . . . .	Oats and barley.
93	. . . . .	Dec. 15,	do.	. .	*									
94	. . . . .	Dec. 29,	do.	*										
		1881.												
95	. . . . .	Jan. 4,	do.	. .	*	*								
96	. . . . .	Jan. 20,	do.	. .	. .	*					*			
97	. . . . .	Jan. 23,	do.	. .	*	. .	*	. .	. .	. .	. .	. .	. . . . .	Apple.
98	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	Orange-peel.
99	. . . . .	do.	do.	*	. .	*								
		1882.												
100	. . . . .	July 8.	do.	. .	. .	. .	. .	. .	. .	. .	*			
101	. . . . .	June 1.	West Bradford, Pa.	*	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	24 grains of wheat
102	. . . . .	do.	do.	*										
103	. . . . .	do.	do.	. .	. .	*	. .	. .	. .	*	. .	. .	. . . . .	Small seeds.
104	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	. . . . .	Green vegetable substance.
105	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	. . . . .	do.
106	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	. . . . .	do.
107	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	. . . . .	do.
108	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	. . . . .	do.
109	. . . . .	June 12.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	Stomach empty.
110	. . . . .	do.	do.	. .	. .	. .	. .	*	. .	. .	. .	. .	. . . . .	do.
111	. . . . .	do.	do.	. .	. .	*	. .	. .	. .	. .	. .	. .	. . . . .	Clover seed.
112	. . . . .	do.	do.	. .	. .	. .	. .	. .	. .	*	. .	. .	2 flies; 3 aptera.	Green vegetable substance.
113	Nestling	do.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	Small mass of cooked beef.
114	do.	do.	do.	. .	. .	. .	. .	. .	. .	. .	. .	. .	. . . . .	Stomach empty.

[Notes by Dr. B. H. Warren.]

The various vegetable materials named in the records given on pages 397 and 398, are, with a few exceptions, included in the following list:

Oats (*Avena sativa*).
Wheat (*Triticum vulgare*).
Rye (*Secale cereale*).
Corn, maize (*Zea Mays*).

Grass seed, Clover seed, Small seeds, etc., refer mainly to the following:

Red clover (*Trifolium pratense*).
White clover (*Trifolium repens*).
Timothy (*Phleum pratense*).
Bitter-weed (*Ambrosia artemisiæfolia*).
Fox-tail grass (*Setaria glauca*). Seeds of other species of *Setaria* are also fed upon.

Buds and blossoms were chiefly of the following kinds:

Pear (*Pyrus communis*).
Plum (*Prunus domestica*).
Cherry (*Cerasus avium*).
Grape (*Vitis*).
Maple (*Acer*).
Black Haw (*Viburnum prunifolium*).

In a few cases remains of the following vegetables were present:

Lima Bean (*Phaseolus lunatus*).
String Bean (*Phaseolus vulgaris*).
Garden Pea (*Pisum sativum*).

Numerous complaints are made by our citizens as to the destruction caused by sparrows to growing pea-vines.

SOME NOCTURAL MIGRANTS.

By Maj. A. G. Wolf, *Keeper of Absecom Light-house, Absecom, Atlantic City, New Jersey.*

List of Birds Striking Lantern of Absecom Light House, Atlantic City, N. J., from August 22, 1889, to November 30, 1889.

Name of Bird.	Date.	Hour of striking.	Birds striking lantern of tower.		Direction and force of wind.	Weather: clear, fog, rain, or snow.
			Number striking.	Number killed.		
Sharp-tailed Finch,	Aug. 22,	11 p. m.,	2	0	NW., light,	Cloudy.
Small Beach Snipe,	Aug. 23,	10.55 p. m.,	6	6	East, light,	"
Red-eyed Vireo,	Sept. 18,	8 p. m.,	43	10	W., NW., light,	Rain.
Blue Yellow-back Warbler,	"	" "	4	1	" "	"
Reedbird,	"	8.30 p. m.,	6	1	" "	"
Connecticut Warbler,	"	" "	2	2	" "	"
Red-throated Woodpecker,	"	9 p. m.,	1	1	NW., light,	"
Red-eyed Vireo,	"	11.20 p. m.,	4	1	" "	Cloudy.
Blue Yellow-back Warbler,	"	" "	5	1	" "	"
Cedarbird,	"	" "	1	0	" "	"
Red-eyed Vireo,	Sept. 19,	3.15 a. m.,	20	7	" "	"
Reedbird	"	" "	5	1	" "	"
Yellow-shafted Flicker,	"	3.40 a. m.,	1	1	" "	"
Rose-breasted Grosbeak,	"	" "	2	0	" "	"
Cedarbird,	"	" "	1	1	" "	"
Maryland Yellow-throat,	"	" "	4	1	" "	"
Red-eyed Vireo,	"	" "	3	3	" "	"
English Sparrow,	"	" "	1	1	" "	"
Brown Thrush,	"	" "	1	0	" "	"
Olive-backed Thrush,	"	8.30 p. m.,	2	0	West, light,	"
Blue Yellow-back Warbler,	"	" "	5	0	" "	"
Connecticut Warbler,	"	" "	1	1	" "	"
Maryland Yellow Throat,	"	10.50 p. m.,	15	4	" "	"
Reedbird,	"	" "	3	1	" "	"
Black-throated Blue Warbler,	"	" "	1	1	" "	"
English Sparrow,	"	" "	2	0	" "	"
Scarlet Tanager,	"	" "	4	0	" "	"
Chestnut-sided Warbler,	Sept. 21,	9 p. m.,	1	1	NW., light,	Clear.
Red-eyed Vireo,	"	" "	7	0	" "	"
Maryland Yellow-throat,	"	" "	6	1	" "	"
Golden Crowned Thrush,	"	" "	2	0	" "	"
Olive-backed Thrush,	"	" "	7	1	" "	"
Creeping Warbler,	"	10.30 p. m.,	1	0	" "	"
Connecticut Warbler,	Sept. 22,	2.30 a. m.,	1	1	" "	"
Catbird,	"	" "	2	0	" "	"
Maryland Yellow-throat,	"	" "	7	1	" "	"
Reedbird	"	" "	1	1	" "	"
Olive-backed Thrush,	"	" "	3	0	" "	"
Herring Gull,	"	" "	1	3	" "	"
Maryland Yellow-throat,	"	10 p. m.,	2	0	" "	"
Sharp-tailed Finch,	"	" "	1	0	" "	"
Red-eyed Vireo,	"	" "	13	1	" "	"
Olive-backed Thrush,	Sept. 23,	2.30 a. m.,	4	1	" "	"
Cedarbird,	"	" "	1	0	" "	"
Scarlet Tanager,	"	" "	1	0	" "	"
Red-eyed Vireo,	"	" "	10	1	" "	"
Golden Crowned Thrush,	"	3.10 a. m.,	2	0	" "	"
Blue Yellow-back Warbler,	"	" "	5	1	" "	"
Catbird,	"	" "	2	0	" "	"
Red-eyed Vireo,	Sep., 24,	9.50 p. m.,	2	0	E., NE., moder'e,	Rain.
Maryland Yellow-throat,	"	" "	1	0	" "	"
Small Beach Snipe,	"	" "	3	3	" "	"
Red-eyed Vireo,	Sept. 26,	9 p. m.,	7	0	NW., light,	"
Olive-backed Thrush,	"	" "	2	0	" "	"
Maryland Yellow-throat,	"	" "	2	0	" "	"
Cedarbird,	Sept. 27,	1.30 a. m.,	2	0	" "	"
Red-eyed Vireo,	"	" "	25	4	" "	"
Olive-backed Thrush,	"	" "	3	0	" "	"
English Sparrow,	"	" "	2	0	" "	"
Yellow-shafted Flicker,	"	" "	1	0	" "	"
Beach Snipe,	"	" "	1	1	" "	"

NOCTURAL MIGRANTS—*Continued.*

NAME OF BIRD.	Date.	Hour of striking.	BIRDS STRIKING LANTERN OF TOWER. Number striking.	Number killed.	Direction and force of wind.	Weather: clear, fog, rain, or snow.
Red-eyed Vireo,	Sept. 27,	3.10 a. m.,	7	1	NW., light,	Clear.
Maryland Yellow-throat,	"	" "	2	0	" "	"
Catbird,	"	" "	1	0	" "	"
Scarlet Tanager,	"	9 p. m.,	2	0	NW., moderate,	"
Olive-backed Thrush,	"	" "	3	0	" "	"
Maryland Yellow-throat,	"	" "	4	0	" "	"
Connecticut Warbler,	"	" "	1	0	" "	"
Catbird,	"	" "	2	0	" "	"
Cedarbird,	"	11 p. m.,	3	0	" "	"
Golden Crowned Kinglet,	Sept. 29,	10.30 p. m.,	1	1	West, moderate,	Cloudy.
Creeping Warbler,	"	" "	1	0	" "	"
Yellow-breasted Chat,	"	" "	1	1	" "	"
Yellow-rump Warbler,	"	" "	5	1	" "	"
Blue-winged Teal (Duck),	"	11.05 p. m.,	3	3	" "	"
Red eyed Vireo,	Sept. 30.	2 a. m.,	14	2	SW., moderate,	"
Reedbird,	"	" "	1	1	" "	"
Maryland Yellow-throat,	"	" "	7	1	" "	"
Yellow-rump Warbler,	"	" "	5	0	" "	"
Olive-backed Thrush,	"	3.25 a. m.,	4	0	SW., light,	"
Catbird,	"	" "	1	0	" "	"
Maryland Yellow-throat,	"	" "	1	0	" "	"
Black-throated Blue Warbler,	Oct. 1,	10 p. m.,	2	0	West, light,	Fair.
Scarlet Tanager,	"	" "	2	0	" "	"
Connecticut Warbler,	"	" "	1	1	" "	"
Yellow-rump Warbler,	"	10.30 p. m.,	6	1	" "	"
English Sparrow,	"	" "	3	0	" "	"
Golden-crowned Thrush,	Oct. 2,	2.30 a. m.,	2	0	NW., light,	Clear.
English Sparrow,	"	" "	3	0	" "	"
Cedarbird,	"	" "	1	0	" "	"
Yellow-rump Warbler,	"	" "	5	0	" "	"
Olive-backed Thrush,	"	" "	2	0	" "	"
Little Gull (tern),	Oct. 25,	3.35 a. m.,	1	0	E., SE., light,	Cloudy.
Maryland Yellow-throat,	Oct. 28,	9 p. m.,	14	1	West, light,	"
Yellow-rump Warbler,	"	9.30 p. m.,	8	3	" "	"
Catbird,	"	" "	2	0	" "	"
Yellow-rump Warbler,	Oct. 30,	3 a. m.,	7	1	N., NW., light,	"
Olive-backed Thrush,	"	" "	3	1	" "	"
Golden-crowned Kinglet,	"	10.50 p. m.,	1	1	West, light,	"
Maryland Yellow-throat,	"	" "	6	1	" "	"
English Sparrow,	"	" "	2	1	" "	"
Beach Snipe,	Nov. 13,	11 p. m.,	5	4	NW., moderate,	"
Yellow-rump Warbler,	"	" "	2	0	" "	"
Catbird,	Nov. 30,	11.20 p. m.,	2	0	NW., light,	Clear.

NOTE.—The foregoing is a copy of the report sent to the Department of Agriculture at Washington, D. C., December 5, 1889, and kindly given to me for publication in this volume by Major Wolf.—WARREN.

PROTECTION OF BIRDS.

AN ACT

Prohibiting the killing or taking of song and wild birds, except in certain cases, and providing a penalty therefor.

WHEREAS, The wilful killing or taking of song and wild birds is the cause of great injury to the agricultural interests on account of the increase in noxious insects which would otherwise be destroyed by said birds; therefore,

SECTION 1. *Be it enacted by the Senate and House of Representatives of the Commonwealth of Pennsylvania in General Assembly met, and it is hereby enacted by the authority of the same*, That no person in any of the counties of this commonwealth shall kill, wound, trap, net, snare, catch, with bird lime or with any similar substance, poison or drug any bird of song or any linnet, blue bird, yellow hammer, yellow bird, thrush, woodpecker, catbird, pewee, martin, bluejay, oriole, kildeer, snow bird, grass bird, grosbeak, bobolink, phœbe-bird, humming bird, wren, robin, meadowlark, nighthawk, starling, or any wild bird other than a game bird. Nor shall any person purchase or have in possession or expose for sale any of the aforesaid song or wild birds or any part thereof, after the same shall have been killed. For the purposes of this act the following shall be considered game birds: The *Anatidæ*, commonly known as swans, geese, brant and river and sea ducks; the *Rallidæ*, commonly known as rails, coots, mud-hens, and gallinules; the *Limicolæ*, commonly known as shore birds, plovers, surf birds, snipe, woodcock, sandpipers, tattlers and curlews; the *Gallinæ*, commonly known as wild turkeys, grouse, prairie chickens, pheasants, partridges and quail, and the *Columbæ*, commonly known as doves and wild pigeons.

SECTION 2. No person shall take or needlessly destroy the nests or eggs of any song or wild birds.

SECTION 3. Sections one and two of this act shall not apply to any person holding a certificate giving the right to take birds and their nests and eggs for scientific purposes as provided for in section four of this act.

SECTION 4. Certificates may be granted by the prothonotary of any county in the commonwealth to any properly accredited person of the age of eighteen years or upward, permitting the holder thereof to collect birds, their nests or eggs for strictly scientific purposes. In order to obtain such certificate the applicant for the same must present to the said prothonotary written testimony from two well-known scientific men certifying to the good character and fitness of said applicant to be entrusted with such privileges; must pay to the said prothonotary the sum of one dollar to defray the necessary expense attending the granting of such certificates, and must file with the said prothonotary a properly executed bond in the sum of fifty dollars, signed by two responsible citizens of the commonwealth as sureties. This bond shall be forfeited to the commonwealth and the certificate become void upon proof that the holder of such a certificate has killed any bird or taken the nest of any bird for other than the purposes named in sections three and four of this act, and shall be further subject for each such offense to the penalties provided therefor in section seven of this act.

SECTION 5. The certificate authorized by this act shall be in force for one year only from the date of their issue and shall not be transferable.

SECTION 6. The English or European house sparrow (*Passer domesticus*) is not included among the birds protected by this act.

SECTION 7. Any person or persons violating any of the provisions of this act, shall

be deemed guilty of a misdemeaner, punishable by imprisonment in the county jail of not less than five nor more than thirty days, or by a fine of not less than ten nor more than fifty dollars or both at the discretion of the court.

SECTION 8. In all actions for the recovery of penalties under this act, said penalties shall be paid to the county treasurer of the county where the offense is committed.

SECTION 9. All acts or parts of acts inconsistent with or contrary to the provisions of this act are hereby repealed.

APPROVED—May 14, 1889.

LIST OF AUTHORITIES.

(A) *Books, catalagues, pamphlets, periodicals, papers, lists, etc., from which quotations have been made in the preceding pages.*

Audubon.—The Birds of America | from drawings made in the United States | and their Territories | By John James Audubon | Philadelphia | J. B. Chevalier | 1840–1844. 7 vols.

Baird.—List of Birds found in the vicinity of Carlisle, Cumberland county, Penna., about Latitude 40° 12′ N., Longitude 77° 11′ W. By Wm. M. and Spencer F. Baird. Published in the American Journal of Sciences and Arts. Vol. xlvi, April, 1844.

Baird, Brewer and Ridgway.—A | History | of | North American Birds | by | S. F. Baird, T. M. Brewer, *and* R. Ridgway | Land Birds | illustrated by 64 plates and 593 wood-cuts | Volume I [-iii]. [Vignette] | Boston | Little, Brown and Company | 1874. (Size 4to, pages about 1800).

Baird, Brewer and Ridgway.—Memoirs of the Museum of Comparative Zoölogy at Harvard College. Vols. xii and xiii. The Water Birds of North America. By S. F. Baird, T. M. Brewer and R. Ridgway. Issued in continuation of the publications of the Geological Survey of California. J. D. Whitney, State Geologist, Boston. Little, Brown and Company, 1884. [Illustrated by numerous wood-cuts; pages 1104.]

Baird, Cassin and Lawrence.—"Baird's Birds of North America."

33d Congress, 2d Session. { Senate } Ex. Doc. No. 78. { — | Reports | of | Explorations and Surveys, | to | ascertain the most practicable and economical route for a railroad | from the | Mississippi River to Pacific Ocean. | Made under the direction | of the Secretary of War, in | 1853–6, | according to acts of Congress of March 3, 1853, May 31, 1854, and August 5, 1854 | — | Volume IX | — | Washington: | Beverley Tucker, Printer | 1858 |. Subtitled as follows: Explorations and Surveys for a railroad route from the Mississippi River to the Pacific Ocean. | War Department | = | Birds: | by Spencer F. Baird, | Assistant Secretary Smithsonian Institution. | With the co-operation of | John Cassin and George N. Lawrence | — | Washington, D. C. | 1858. pp. i–lvi, 1–1005.

Barnard.—A catalogue of the Birds of Chester county, Pennsylvania, with their times of arrival in spring, from observations annually taken for ten successive years. By Vincent Barnard. pp. 434—438. Smithsonian Report, 1860.

Barrows.—U. S. Department of Agriculture. | Division of Economic Ornithology and Mammalogy. | Bulletin 1. | = | The | English Sparrow | (Passer domesticus) | in North America, | Especially in its relations to agriculture | — | Prepared under the direction of Dr. C. Hart Merriam, Ornithologist. | By Walter B. Barrows | assistant ornithologist | — | Washington: Government Printing office, | 1889. | (pp. 405; with map showing the distribution of the English Sparrow in the U. S. and Canada at the end of the year 1886).

Barrows—The Food of Crows. By Walter B. Barrows, S. B., assistant ornithologist. From Annual Report U. S. Department of Agriculture, for the year 1888. pp. 498—535.

***Committee, American Ornithologists' Union.**—The Code of Nomenclature | and | check-list | of | North American Birds | adopted by the American Ornithologists' Union | Being the Report of the Committee of the | union on classification and | nomenclature | — | (Motto) | — | New York | American Ornithologists' Union | 1886. (8vo., pp. I—viii, 1–392).

*Elliott Coues, J. A. Allen, Robert Ridgway, William Brewster, and H. W. Henshaw.

Coues.—Key | to | North American Birds. | Containing a concise account of every species of living and fossil | bird at present known from the continent north of the | Mexican and United States boundary, inclusive | of Greenland and lower California, | with which are incorporated | General Ornithology; | An outline of the structure and classification of birds | and | Field Ornithology | a manual of collecting, preparing, and preserving birds | The third edition, | exhibiting the new nomenclature of the American Ornithologists' Union, and | including descriptions of additional species, etc. | By Elliott Coues, A. M., M. D., Ph. D., etc., etc. | Profusely illustrated | (pp. i-x, i-xxx, 1-895) | Boston (Mass). | Estes and Lauriat. | 1887.

Coues.—Department of the Interior. | United States Geological Survey of the Territories. | F. V. Hayden, U. S. Geologist-in-charge. | Miscellaneous Publications—No. 3. | Birds of the Northwest: | A hand-book | of | The Ornithology | of the | region drained by the Missouri river | and its tributaries. | — | By Elliott Coues, | Captain and Assistant Surgeon U. S. Army. | — | Washington | Government Printing office, | 1874. pp. i-xi, 1-791.

Coues.—Department of the Interior. | United States Geological Survey of the Territories | F. V. Hayden, U. S. Geologist in Charge. | Miscellaneous Publications—No. 11 | — | Birds of the Colorado Valley | a Repository of | scientific and popular information | concerning | North American Ornithology | By Elliott Coues | — | Part First | Passeres to Laniidæ | Bibliographical Appendix | Seventy Illustrations | — | Washington | Government Printing office | 1878. pp. i-xvi, 1-807.

Davie.—Nests and Eggs | of | North American Birds | By Oliver Davie | Third Edition, Revised and Augmented | Introduction by J. Parker Norris. | Illustrations (13) | by Theodore Jasper, A. M., M. D., and W. Otto Emerson. | — | Columbus | Hann & Adair | 1889. pp. 1-455, -i-xii.

Everhart.—Miscellaneous Bird-notes (manuscript) relative to species observed in Chester, and neighboring counties, during a period of over sixty years. By Benj. M. Everhart, Botanist, West Chester, Penna.

Fisher.—Food of Hawks and Owls, by Dr. A. K. Fisher, Assistant Ornithologist; from the Annual Report of the U. S. Department of Agriculture for the year 1887. pp. 402-422.

Graves.—Some Notes (manuscript) on species observed in Chester, Berks and adjoining counties during a period of about fifty years, by Henry B. Graves, Geigers Mills, Berks county, Penna.

Gentry.—Life Histories of the Birds of Eastern Pennsylvania, by Thomas G. Gentry, | member of the Academy of Natural Sciences of Philadelphia, and of | the Canadian Entomological Society of Toronto. | — | In two volumes. Vol. I. | — | Philadelphia: | Published by the author (H. Smith, Printer) | 1876. Vol. ii. Salem, Mass | The Naturalists' Agency. | 1877. 8 vo. Vol. I, pp. xvi, 1-399. Vol. ii, 4p., pp. 1-336.

Henshaw.—Report | upon | the Ornithological Collections—Made in portions—of Nevada, Utah, California, Colorado, New Mexico and Arizona—during the years 1871, 1872, 1873 and 1874. | By H. W. Henshaw. | Gov. Printing Office. | Washington, D. C. | 1875. pp. 133-507. 15 colored plates.

Krider.—Notes (manuscript) of certain Rare Birds observed in the vicinity of Philadelphia. By Joseph Krider, Philadelphia, Penna.

Langdon.—Summer Birds of Northern Ohio Marsh. By F. W. Langdon. Journal Cincinnati Society Natural History, Vol. iii, 1880. pp. 220-232.

Libhart.—Ornithology of Lancaster county, by Hon. J. J. Libhart. Published in the History of Lancaster county, Penna. 1869. pp. 502-516. (An annotated list of 250 species.)

Michener.—List of the Birds of Chester county, by Dr. Ezra Michener. Published in the History of Chester county, Penna. 1881. pp. 441-445.

Nelson.—$\frac{\text{49th Congress, 1st Session,}}{\text{Senate}}$ $\frac{\text{Mis. Doc. No. 156.}}{}$ | = | Report | upon | Natural History Collections | made in | Alaska | between the years 1877 and 1881 | by Edward W. Nelson. | — | Edited by Henry W. Henshaw. | — | Prepared under the direction of the Chief Signal Officer. | — | No. iii. | Arctic Series of Publications issued in connection with the Signal Service, U. S. Army, | With 21 plates | — | Washington : | Government Printing office. | 1887. 337 pages. 4to.

Nuttall.—A | Manual | of the | Ornithology | of the | United States and of Canada. | By Thomas Nuttall, A. M., F. L. S., etc. | — | The Land Birds | — | — | Cambridge : | Hilliard and Brown, | booksellers to the university | — | MDCCCXXXII. | 12mo. pp. vii, 1–683 ; 53 wood-cuts. [Vol. ii.] The Water Birds | — | — | Boston : | Hilliard, Gray and Company. | — | MDCCCXXIV. 12mo. pp. vii, 1–627. Sixty-two wood-cuts.

Ridgway.—A | Manual | of | North American Birds. | By Robert Ridgway. | — | Illustrated by 464 outline drawings of the | generic characters | — | Philadelphia : J. B. Lippincot Company. | 1887. pp. i–xi, 1–631.

Ridgway.—A | nomenclature of colors | for naturalists, | and | compendium of useful knowledge | for ornithologists, | by Robert Ridgway, | Curator, Department of Birds, United States National Museum. | With ten colored plates and seven plates | of outline illustrations. | Boston : | Little, Brown and Company. | 1886. p. 129.

Ridgway.—Natural History Survey of Illinois. | State Laboratory of Natural History. | S. A. Forbes, director. | — | The Ornithology | of Illlinois | — | Part I, Descriptive Catalogue, | by Robert Ridgway. | Part II. Economic Ornithology, | by S. A. Forbes. | — | Volume I. | — | Published by authority of the State Legislature. | — | Springfield, Ill.: | H. W. Rokker, printer and binder, | 1889. p. 520. [One full page colored plate (*Sturnella magna*) and xxxii plates, xx of which contain numerous outline drawings of the generic characters.]

Samuels.—Our Northern and Eastern Birds, by E. A. Samuels. 1883. pp. i–iv, 1–600.

Townsend.—Notes on the Birds of Westmoreland County, Pennsylvania, by Charles H. Townsend. Published in proceedings of the Academy of Natural Science of Philadelphia, 1883. pp. 59–68.

Turnbull.—The | Birds of East Pennsylvania | and New Jersey, | by William P. Turnbull, LL. D., | author of the "Birds of East Lothian;" | member of the Academy of Natural Sciences of Philadelphia ; | of the Lyceum of Natural History, New York ; | corresponding member of the Natural History Society of Glasgow, etc. | [Illustration of Meadowlark.] | Glasgow : Printed for private circulation, [by A. K. Murray & Co.,] | 1869. 1 vol. roy. 8vo, pp. xii, 1–62, with 20 illustrations.

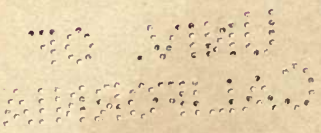
Turner.—$\frac{\text{49th Congress, 1st session.}}{\text{Senate}}$ $\frac{\text{Mis. Doc. No. 155.}}{}$ | = | Contributions | to the | Natural History of Alaska | — | Results of investigations made chiefly in the Yukon | district and the Aleutian islands | conducted under the auspices of the signal service, | United States Army, extending from May, 1874, to August, 1881. | Prepared under the direction of | Brig. and Bvt. Maj. Gen. W. B. Hazen, | chief signal officer of the army, | by L. M. Turner. | — | No. 11. | Arctic series of publications issued in connection with the signal service, U. S. Army. | With 26 plates. | — | Washington : | Government printing office, | 1886. 226 pages, 4to.

Warren.—Report | on the | Birds of Pennsylvania. | With special reference to the food-habits, based | on over three thousand stomachs | examinations, | by B. H. Warren, M. D., | ornithologist of the State Board of Agriculture, etc., | illustrated with fifty plates. | — | Harrisburg: | Edwin K. Meyers, state printer, | 1888. pp. i–xii, 1–260.

Wheaton.—Ohio Geological Survey, Vol. IV, Section II. | — | Report on the Birds of Ohio, | by J. M. Wheaton, M. D. (Published about November 1, 1879.) pp. 438, 8vo.

1. Tufted Titmouse. 2. Mocking-bird. 3. Oven-bird.

Males.



Wilson.—American Ornithology | or | the Natural History | of the | Birds of the United States | illustrated with plates | engraved and colored from original drawings taken from nature | by Alexander Wilson. | Published by Bradford and Inskeep, Philadelphia, | 1808-1814, 9 Vols.

Wilson and Bonaparte.—American Ornithology; | or, | The Natural History | of the Birds of the United States, | illustrated with plates | engraved and colored from original drawings from nature, | by Alexander Wilson | and | Charles Lucian Bonaparte. | With a Sketch of the Life of Wilson, | by George Ord, F. L. S., | and | a classification of the genera and species of North American Birds, | by Spencer F. Baird, | of the Smithsonian Institution, | Vol. I, (II, III.) | Philadelphia: | Porter and Coates. | Date not given. (1871).

[NOTE. Extracts were also made from different numbers of Bulletin Nuttall Ornithological Club. the Auk. Forest and Stream. and the Ornithologist and Oologist. likewise several papers prepared by the author. and published in annual reports of the Pennsylvania State Board of Agriculture.]

(B) *Names of persons who have courteously sent the writer lists of species found in different counties of the commonwealth, or otherwise materially aided him in securing much valuable information concerning the avifauna of Pennsylvania.*

In June, 1889, the writer prepared a "Provisional List" of the Birds of Pennsylvania, with a view of learning the status of numerous species and subspecies which had been attributed by various observers (reliable and otherwise) to our fauna, and distributed the same to naturalists and collectors in all sections of the State. The following is a copy of the introductory page of said list (thirteen pages). About five hundred, with circular letters, were distributed throughout the commonwealth. Of this number between eighty and ninety were returned. Several which had been carefully revised, were unfortunately valueless as the senders neglected to give their names; a few persons marked the lists so as to render them unintelligible.

Provisional list, including natives, permanent residents, spring and fall migrants, occasional visitants and "stragglers" or accidental visitants. Compiled by B. H. Warren, M. D., West Chester, Pa.

The numbers following the common names refer to check-lists of Prof. S. F. Baird (marked B), published in 1858; Dr. Elliott Coues (marked C), published in 1873; Prof. Robert Ridgway (marked R), published in 1880: Dr. Elliott Coues (marked C), published in 1882, and that of the American Ornithologists' Union (marked U), published in 1886,

In addition to the different birds observed by myself, I have added a number of species which have been given in writings (published and unpublished) of different observers. This list has been prepared for gratuitous distribution among ornithologists and oölogists who are respectfully requested to make such additions and corrections as their field experience will warrant.

The following suggestions are offered to those who will kindly aid in the preparation of an accurate list of the Birds of Pennsylvania:

1. Mark with an * before the common names, the birds which breed regularly in your locality.

2. Place the letter R after the common names of birds found in your locality during all months of the year.

3. Indicate the birds which occur in your locality as spring and fall migrants, by the letter M.

4. Birds which are found in your locality only during the winter season mark with the letter W.

5. Place the letter Z after the common names of birds which occur in your locality as occasional visitants, and state if possible what month and year the species was last seen.

6. Birds which you regard as "stragglers" or accidental visitants, mark with the letter S.

Do you know of any wild pigeon (*Ectopistes migratorius*) roosts or breeding places in this state; if so, where are they? Also state last authentic record of a wild pigeon roost or breeding place in Pennsylvania which is known to you.

Do you know of any birds not mentioned in the following list which are found in Pennsylvania? If so please name them and state by whom, where and when specimens were taken.

Do you know of any birds named in this list which are erroneously included in our fauna?

(C) *Local lists received and names of persons contributing the same to the author:*

Balliet, Dr. L. D., Du Bois, Clearfield county.
Ball, Joseph Price, Frankford, Philadelphia county.
Behr, Otto, Lopez, Sullivan county.
Bolton, W. P., Liberty Square, Montgomery county.
Bohn, J. G., Lebanon, Lebanon county.
Brown, Hon. Gerard C., Yorkanna, York county.
Buller, W. H., Marietta, Lancaster county.
Burns, Frank L., Berwyn, Chester county.
Camp, J. L., Herrick, Bradford county.
Compton, Murat, Washington, Washington county.
***Detwiller, Dr. John W.**, Bethlehem, Northampton county.
Eldon, Charles H. (taxidermist), Williamsport, Lycoming county.
Everhart, Dr. Isaiah F., Scranton, Lackawanna county.
Fisher, W. P., Fleming, Centre county.
†**Friant, George P.** (taxidermist), Scranton, Lackawanna county.
Galen, James, Rawlinsville, Lancaster county.
Gehris, Milton D., Kutztown, Berks county.
‡**Gerner, Rev. A. H.**, Sing Sing, New York.
Gillin, Thomas S., Ambler, Montgomery county.
Green, J. F., Scranton, Lackawanna county.
Greenlund, H. L., Warren, Warren county.
Hark, O. B., Bethlehem, Northampton county.
Hartman, Dr. W. L., Pittston, Luzerne county.
Hazzard, Dr. T. Z., Allegheny, Allegheny county.
Jamison, H., Manayunk, Philadelphia county.
Johnson, Rev. Joseph, Frankford, Philadelphia county.
Keller, D. Frank, Reading, Berks county.
Ketcham, J. W., Minnequa, Bradford county.
Kirkpatrick, H. C. (taxidermist), Meadville, Crawford county.
Kocher, J. F., South Whitehall, Lehigh county.
Kock, Prof. August, Williamsport, Lycoming county.
Larrabee, M. M., Emporium, Cameron county.
Lee, Alfred P., Oxford, Chester county.
Lilley, A. T., LeRoy, Bradford county.
Linskill, David J., Plymouth, Luzerne county.
Linton, G. W., Masontown, Fayette county.
Loucks, Casper, York, York county.
MacCrea, Dr. A. B., Berwick, Columbia county.
Miller, George, York, York county.
Moore, Dr. H. D., New Lexington, Somerset county.
Morris George Spencer, Olney, Philadelphia county.

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* Also notes relative to species in various parts of the state.
† Also notes of species observed in Wyoming county.
‡ List of species observed in the vicinity of Milford, Pike county.

1. Wood Thrush. *2. Olive-backed Thrush.*
3. Hermit Thrush. *4. Wilson's Thrush.*

Males.

Nease, James S., Washington, Washington county.
Neff, T. L., Carlisle, Cumberland county.
Nelis, Justin, Dingman's Ferry, Pike county.
Overmoyer, S. S., New Lebanon, Mercer county.
Paschall, S. Edward, Doylestown, Bucks county.
Perry, George B., Brooklyn, Susquehanna county.
Park, W. H., (taxidermist), Athens, Bradford county.
Rees, W. G., Reading, Berks county.
Rice, Mrs. M. H., Lahaska, Bucks county.
***Ricksecker, Edmund**, Nazareth, Northampton county.
Riday, J. Wesley, Coatesville, Chester county.
Ritchie, Mrs. William, Buffalo, Washington county.
Robertson, Prof. J. R., Franklin, Venango county.
† **Roddy, Prof. H. Justin**, Millersville, Lancaster county.
Ross, George R., Lebanon, Lebanon county.
Scroggs, Dr. G. A., Beaver, Beaver county.
Sears, George W., Wellsboro', Tioga county.
‡ **Sennett, George B.**, Erie, Erie county.
Stern, Jonas, Kutztown, Berks county.
Sterrett, Harry, Titusville, Crawford county.
Stocy, W. W. (taxidermist), Harrisburg, Dauphin county.
Stone, Witmer, Philadelphia, Philadelphia county.
Swayne, Wm. M., Kennett Square, Chester county.
Teulon, James A., Bradford, McKean county.
Thomas, S. S., Springville, Susquehanna county.
Tingley, Dr. H. A., Susquehanna, Susquehanna county.
Townsley, Robert, Trainer, Delaware county.
Treichler, Dr. A. C., Elizabethtown, Lancaster county.
Underwood, Hon. N. F., Lake Como, Wayne county.
‖ **Van Fleet, Dr. Walter**, Renovo, Clinton county.
Warrick, W. T., Washington, Washington county.
Webster, M. J., Madisonville, Lackawanna county.
Williams, Jr., H. W., Scranton, Lackawanna county.
Wilson, Harry, Gum Tree, Chester county.
Wrenshall, R. C., Pittsburgh, Allegheny county.

* With, also, notes of certain species found breeding in Monroe county. List and notes were received from Mr. E. Ricksecker, July 5, 1887.

† List of species occurring in Perry county; also notes concerning species observed in Centre and other counties.

‡ Also list of species found in Crawford county.

‖ Also lists of Clearfield and Northumberland counties, and notes referring to species in several other counties.

(D) *Aided by the following-named members of the Pennsylvania State Board of Agriculture, the author was greatly assisted in being placed in communication with reliable correspondents in nearly every county in the Commonwealth.*

Adams, I. Garretson, Biglerville.
Armstrong, Hon. Noah Seanor, Plumville.
Beaver, A. L. McKibben, Green Garden.
Bedford, S. S, Diehl, Bedford.
Berks, G. D. Stitzel, Reading.
Bucks, E. Reeder, New Hope.
Butler, W. H. H. Riddle, Butler.
Bradford, R. H. Laning, Towanda.
Blair, Frederick Jaekel, Hollidaysburg.
Clarion, W. Shanafelt, Clarion.
Chester, T. J. Edge, Harrisburg.
Chester, Samuel R. Downing, West Chester.
Centre, Dr. E. W. Hale, Bellefonte.
Clinton, J. A. Herr, Cedar Springs.
Columbia, Chandlee Eves, Millville.
Crawford, J. B. Phelps, Conneautville.
Crawford, Hon. Will B. Powell, Springboro'.
Cumberland, C. H. Mullin, Mt. Holly Springs.
Dauphin, G. Hiester, Harrisburg.
Erie, J. C. Thornton, Avonia.
Franklin, D. Z. Shook, Greencastle.
Indiana, W. C. Gordon, Black Lick.
Jefferson, J. McCracken, Jr., Frostburg.
Lackawanna, H. H. Colvin, Dalton.
Lancaster, Calvin Cooper, Bird-in-Hand.
Lawrence, Samuel McCreary, Neshannock Falls.
Lebanon, C. R. Lantz, Lebanon.
Lehigh, Dr. J. P. Barnes, Allentown.
Luzerne, J. B. Smith, Kingston.
Lycoming, P. Reeder, Hughesville.
Mercer, Robert McKee, Mercer.
Montgomery, H. W. Kratz, Norristown.
Montour, J. K. Murray, Potts Grove.
Northampton, A. D. Shimer, Bethlehem.
Northumberland, John Hoffa, Milton.
Perry, F. H. McKeehan, Ferguson.
Schuylkill, J. T. Shoener, Orwigsburg.
Somerset, Hon. N. B. Critchfield, Quemahoning.
Sullivan, J. H. Lawrence, Dushore.
Susquehanna, R. S. Searle, Montrose.
Tioga, J. W. Mather, Wellsboro'.
Union, J. A. Gundy, Lewisburg.
Venango, Capt. A. Frazier, Cooperstown.
Warren, Charles Lott, North Warren.
Washington, John McDowell, Washington.
Wayne, N. F. Underwood, Lake Como.
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GLOSSARY OF TECHNICAL TERMS USED IN THE PRECEDING DESCRIPTIONS.

[These definitions are compiled from Robert Ridgway's Nomenclature of Colors, and Dr. Elliot Coues' * Glossary.]

A.

Ab'domen.—Belly; under surface of body from breast-bone to vent; bounded laterally by the sides, posteriorly by the vent or anal region and anteriorly by the breast.

Abdo'minal.—Pertaining to the abdomen.

Aber'rant.—Deviating from the usual character.

Acces'sory.—Joined to another thing; additional (as an accessory plume).

Accip'itres.—Plural of *Accipiter;* also the name of a more or less artificial group of birds, including the so-called "Birds of Prey" or *Raptores* of some authors.

Accip'itrine.—Hawk-like.

Acu'minate.—Tapering gradually to a point.

Acute'.—Sharp-pointed.

Adult'.—Grown to full size; mature (a bird may be adult as regards organization without being of adult plumage).

Af'ter-shaft.—Properly, the stem of the supplementary plume springing from near the base of some feathers; ordinarily, however, applied to the plume itself.

Al'ar.—Pertaining to the wings.

Alimen'tary.—Pertaining to the digestive organs.

Al'trices.—Birds reared in the nest and fed by the parents. With the exception of the *Raptores*, some of the *Steganopodes* and *Pygopodes*, the *Longipennes* and *Sphenisci*, the young of the *Altrices* are born naked, or only partly clad.

Alu'la.—"Bastard-wing;" spurious-wing composed of several stiff feathers growing on the so-called thumb. They are situated directly below the secondary or greater coverts, and collectively resemble a little wing.

A'nal.—Pertaining to the anus.

A'nal region.—The feathers immediately surrounding the anus.

An'nular.—Ringed.

Ano'malous.—Very strange or unusual.

An'serine.—Goose-like.

An'te.—Anterior to, or before; as *anteorbital*, *anteocular*, etc.

Ante'rior.—Forward; in front of.

Antrorse.—Directed forward, as the nasal tufts of most jays and crows, and the rectal bristles of many birds.

A'nus.—Outlet of refuse of digestion. In birds the same orifice discharges the products of the genito-urinary organs.

A'pex.—Tip or point of anything.

Aquat'ic.—Pertaining to the water; said of birds frequenting water, and thence drawing subsistence.

Arbo'real.—Tree-inhabiting.

Ash or **Ash'y.**—Pale gray.

Atten'uate.—Tapering or gradually growing narrower toward the extremity, but not necessarily pointed or *acuminate.*

Auric'ular.—Pertaining to the ear.

Auric'ulars.—Ear-coverts. The (usually) well-defined feathered area which conceals the ears in birds.

* Hist. N. Am. B, Vol. III, pp. 535-560.

Autum'nal Plu'mage.—The full dress of the autumn. In most birds it remains essentially unchanged till the spring moult. In many species the young possess a peculiar autumnal plumage (assumed by the first moult) which differs not only from their first livery but also from that of adults at the same season. In such, the adult or mature plumage may be completely assumed at the next moult, or it may be gradually acquired by successive moults, as in the case of many Orioles (*Icteridæ*), Tanagers and other bright-colored Passerine groups.

A'vis.—Plural *aves*. Bird.

Av'ian Fauna. }
Avi-fauna. } The bird-life of a particular country or locality.

Ax'illa.—Armpit.

Ax'illar. }
Ax'illary. } Pertaining to the armpit.

Ax'illaries. }
Ax'illares. } The (generally) soft and lengthened feathers growing from the arm-pit.

B.

Back.—Dorsum. In descriptive ornithology, usually includes the scapulars and interscapulars, but should properly be restricted to the latter alone.

Back of Neck.—Cervical region. Includes *Nucha* and *Cervix* (which see). Equivalent to hind-neck.

Band.—Any crosswise color-mark, transverse to the long axis of the body. A broad band is usually called a *zone*.

Band'ed or Barred.—Marked with bands or bars.

Barb.—Any one of the laminæ composing the web of a feather.

Barb'ed.—Furnished with barbs; bearded.

Base.—Bottom; root; origin.

Ba'sal.—Pertaining to the base.

Bay.—A very rich dark reddish chestnut.

Beak.—Bill.

Bel'ly.—See *abdomen*.

Belt.—A broad band of color across the breast or belly. (Distinguished from *zone* in that the latter may cross the wings or tail.)

Belt'ed.—Marked with a broad band of color across the lower part of the body, as in the Belted Kingfisher.

Bend of Wing.—Angle or prominence formed at the carpus (wrist-joint), in the folded wing.

Bev'y.—A flock of quails or partridges.

Bi'-colored.—Two-colored.

Bino'mial.
Bino'minal.
Two-named, or, more properly named by two terms. The *binominal system of nomenclature*, instituted in 1758 by Linnæus, and adopted by zoölogists and botanists, promulgates the use of two terms as the name of each species—the first generic, the second specific.

Boot.—In birds, the tarsal envelope, when entire.

Boot'ed.—A booted tarsus has the usual scales fused so as to form a continuous or uninterrupted covering. The tarsus of the smaller thrushes and American Robin (*Merula migratoria*) well illustrate this character.

Bo'real.—Northern.

Breast.—Anterior portion of lower part of trunk, between jugulum and abdomen; properly, the region overlying and containing the breast-bone, but generally restricted to the more forward swelling portion of each region.

Bris'tle.—Small, stiff, hair-like feather, especially about the mouth or eyes, but sometimes on other portions of the plumage also.

Buff or Buffy.—Pale brownish-yellow; color of yellow buckskin.

C.

Capi'tal.—Pertaining to the head.

Cap'itate.—A *capitate feather* has the end enlarged.

Carniv'orous.—Flesh-eating.

Car'mine.—A very pure and intense crimson. The purest of the cochineal colors.

Car'pal.—Pertaining to the *carpus*, or wrist.

Car'pus.—The wrist. In a bird the space between the bend (*flexura*) and the hand-joint of the wing.

Car'uncle.—Small fleshy excrescence, usually about the head or neck (as in Turkey Buzzard, Wild Turkey, etc.,) generally naked, and wrinkled, warty, or brightly colored.

Carun'culated—Having caruncles.

Cau'da.—The tail.

Cau'dal.—Pertaining to the tail.

Cere.—The naked skin or membrane in which the nostrils are situated, common in most birds of prey (*Raptores*) and many of the Parrot-tribe (*Psittaci*), as well as the Pigeons (*Columbæ*), and some other groups. It usually has a more or less distinct line of demarcation anteriorly (except in the Pigeons).

Cer'vical.—Pertaining to the hind-neck or cervix.

Cer'vix.—The hind-neck; from occiput to the commencement of back, including the nape and scruff.

Char'acter.—Any material attribute susceptible of definition for use in description and classification. Also, a sum of such attributes, as, of passerine *character*.

Cheek.—An arbitrary sub-division of the side of the head, differently employed by various writers, but usually corresponding to the *malar region*, or the feathered portion of the lower jaw.

Chest'nut.—Rich dark reddish brown color, of a slightly purplish cast.

Chin.—The most anterior point of the gular region, or the space between forks of lower jaw.

Cine'reous.—Ash-gray; a clear bluish gray color, lighter than plumbeous (lead-color).

Cir'cular.—Of a rounded shape.

Class.—A primary division of animals, as the *class* of Birds (*Class Aves*).

Classifica'tion.—Systematic arrangement.

Claw.—The horny, pointed, and compressed sheath of the terminal phalanx of the toe.

Clutch.—Nest-complement of eggs.

Col'lar.—A ring of color around neck.

Colora'tion.—Pattern or mode of coloring, or the colors of the plumage collectively.

Commis'sural.—Pertaining to the commissure.

Com'missure.—The outlines of the closed bill, or the opposed edges of the mandible and maxilla.

Compress'ed.—Narrowed sideways; higher than wide.

Con'fluent.—Run together.

Coniros'tral.—Having a conical bill, like that of a finch or sparrow.

Cord'ate.
Cord'iform. } Heart-shaped.

Cor'nu.—Horn.

Coro'na.—Top of head. Equivalent to cap or pileus. Vertex is the highest point of corona.

Cor'rugate.
Cor'rugated. } Wrinkled.

Co'vey.—A family (or brood with or without their parents) of quails or other game-birds.

Cream Color.—A light pinkish yellow color, like cream.

Crepus'cular.—Pertaining to twilight. (Crepuscular birds are those which become active after sunset.)

Cres'cent.—A figure having the shape of a new moon.

Crescent'ic.—Shaped like the new moon.

Crest.—A more or less lengthened, erectile, or permanently erect, tuft of feathers on top of the head.

Crest'ed.—Having a crest, as the Blue Jay.

Crim'son.—Blood-red; the color of the cruder sorts of carmine.

Cris'sum.—A term usually applied to the lower tail-coverts collectively, but properly belonging to the feathers situated between the lower tail-coverts and the anal region.

Cris'sal.—Pertaining to the crissum.

Crown.—Pileus, top of head, especially the vertex.

Cul'men.—Ridge of maxilla or upper mandible.

Cul'minal.—Pertaining to the culmen.

Cu'neate. } Wedge-shaped. A cuneate tail has the middle feathers longest, the
Cu'neiform. } rest successively regularly shorter.

D.

Decid'uous.—Temporary; falling early. The dorsal plumes of the egret are *deciduous.*

Decompos'ed.—Separate; standing apart. A *decomposed* crest has the feathers standing away from each other.

Decum'bent.—Drooping or hanging downward.

Decurved'.—Gradually curved downward. Opposed to *recurved.*

Degluti'tion.—Act of swallowing.

Den'tate.—Toothed.

Depress'ed.—Flattened vertically; broader than high. Opposite of *compressed.*

Diagno'sis.—A condensed statement of the characters which are exclusively applicable to a species, genus, or higher group; a description which omits all non-essential characters,

Digitus.—Digit. Finger or toe.

Disc. } Set of radiating feathers surrounding the eye in some birds, especially the
Disk. } owls.

Dis'tal.—Remote; situate at or near an extremity; opposite to *proximal.*

Diur'nal.—Pertaining to the daytime. Among birds, those which are active during the daytime and repose at night. (Many diurnal birds, however, are nocturnal in their migrations.

Dor'sal.—Pertaining to the back.

Dor'sum.—Back; upper surface of trunk from neck to rump.

Double-rounded. } A *doubly-forked* tail has the middle and lateral feathers decid-
Doubly-rounded. } edly longer than those between.

Down.—Small soft decomposed feathers, which clothe the nestlings of many birds, and which also grow between and underneath the true feathers in the adults of many others, especially the various kinds of water-fowl.

Drab.—A brownish gray color.

Dusk'y.—Of any indefinite dark color.

E.

Ear-cov'erts.—The usually well-defined tract of feathers overyling the ears of most birds. The ear-coverts (or *auriculars*, as they are usually termed in descriptions) are bounded above by the backward extension of the *supercilium*, or lateral portion of the crown, posteriorly by the occiput and nape, below by the malar region or "cheeks," and anteriorily by the suborbital region. Same as *auriculars.*

Ear'ed.—Having lengthened or highly colored auricular or other feathers on the side of the head.

Ear-tufts.—Erectile tufts of elongated feathers springing from each side of the crown or forehead, and presenting a close superficial resemblance to the external ears of many mammalia. They are especially characteristic of certain owls. (*Strigidæ*).

Edg'ed.—Having the edge or lateral margin of a different color.

Edge of wing.—The anterior border of the wing, from the armpit to the base of the outer primary.

El'evated.—Said of the hind toe when inserted above the level of the others.

Elon'gate.—Lengthened beyond the usual ratio.

Emarg'inate. **Emarg'inated.** An *emarginate tail* has the middle feather shortest, the rest successively a little longer; hence our emarginate tail is very slightly forked. An *emarginate quill* has the web suddenly narrowed by an abrupt cutting away of the edge.

Excres'cence.—Outgrowth, fleshy, or cutaneous.

Ey're. **Ey'rie.** The nest of a bird of prey, especially an eagle.

F.

Fa'cial.—Pertaining to the face.

Fal'cate.—Sickle-shaped; scythe-shaped.

Fam'ily.—A systematic group in scientific classification, embracing a greater or less number of genera which agree in certain characters not shared by other birds of the same Order. In rank, a *Family* stands between *Order* and *Genus*, the former being composed of a greater or less number of nearly related families. In zoölogical nomenclature the name of a Family is taken from a typical Genus, the name of which is modified by the termination *idæ;* as *Falconidæ*, *Columbidæ*, etc. Subfamilies are distinguished by the termination *inæ*.

Fau'na.—The animal-life of a country or locality.

Ferrugin'eous. **Ferru'ginous.** Rusty-red; like color of iron-rust.

Fil'ament.—A slender or thread-like fibre.

Flanks.—The most posterior feathers of sides.

Fore'head. **Front.** Front of head from bill to crown.

Fore'neck.—A rather indefinite and arbitrary term, variously applied, but usually referring to the lower throat and jugulum, though not infrequently to the whole of the space included by the chin, throat and jugulum. In long-necked birds only does the term become of definite application.

Form.—In a special sense, a sort of non-committal term frequently used by modern writers to designate what is of doubtful rank. The term "form" is thus used for what may prove to be a species, or may be only a race, but as to the rank of which the author is in doubt.

Fos'sa.—A ditch or groove. Used chiefly in the plural (*Fossæ*) to denote the pits or grooves in which most birds' nostrils open.

Fos'ter parent.—A bird which has reared the young of a parasitic species.

Front'al.—Pertaining to the forehead.

Frugiv'orous.—Fruit-eating.

Fulig'inous.—Sooty brown, or dark smoke-color.

Ful'vous.—Of a brownish-yellow color; tawny.

Fur'cate.—Forked.

Fus'cous.—Dark-brown, of a rather indefinite .

G.

Gallina'ceous.—Belonging to the Order *Gallinæ*; having the nature of the domestic fowl.

Gape.—The opening of the mouth.

Gastræ'um.—The whole under part of a bird.

Gen'era.—Plural of *Genus*.

Gener'ic.—Pertaining to a *Genus*.

Ge'nus.—An assemblage of species, or a single species, constituting a taxonomic group of value next below that of the family.

Gib'bose. } Swollen; protuberant.
Gib'bous. }

Gibbos'ity.—A swelling or protuberance.

Glau'cous.—A whitish-blue color, like the "bloom" of a cabbage-leaf.

Go'nys.—The keel or lower outline of the maxilla or lower mandible, from the tip to the point where the rami begin to diverge.

Gorg'et.—Throat-patch, distinguished by color or texture of the feathers.

Grad'uated. } A *graduated tail* has the middle feathers longest, the rest successively shorter; the difference in length not so great, however, as in a *cuneate* tail.
Grad'uate. }

Grallato'res. } An arbitrary and artificial group of the older classifications, in-
Grallato'riæ. } cluding the wading birds.

Graniv'orous.—Seed-eating.

Greater Coverts. } The most posterior series of wing-coverts, or those which immediately overlay the base of the secondaries; hence often very appropriately called *Secondary coverts*.
Greater Wing-coverts. }

Ground-color (*in oölogy*).—The color of the general surface of the egg-shell, as distinguished from its markings.

Gu'la.—The throat.

Gu'lar.—Pertaining to the throat.

Gut'tate.—Drop-shaped or tear-shaped.

H.

Hab'itat.—Locality or region frequented by a species; its geographical distribution.

Hal'lux.—In birds possessing four toes, the hinder one is the hallux, no known bird having four toes directed forwards. In some birds, as certain plovers, the bustards (*Otididæ*), the *Struthiones*, etc., the hallux or hind toe is wanting. In three-toed birds having two toes in front and one behind, the hallux is usually the one wanting, the hind toe being in reality the fourth (or outer) toe reversed. When the toes are in pairs (two before and two behind) the hallux is usually the inner of the hinder pair, the exception being in the Trogans (*Trogonidæ*). The hallux reaches its best development in the *Passers*, the *Accipitres*, *Striges*, and *Rallidæ*, but more especially in the first, in which it is usually as strong, if not stronger, than the largest of the anterior toes.

Has'tate.—Spear-head shaped.

Ha'zel.—An orange-brown color, like the shell of a hazel-nut or filbert.

Hel'met.—A naked shield or protuberance on the top or fore part of the head.

Herodio'nes.—A natural group of altricial warders, embracing the storks, wood-ibises, spoonbills, boatbills and herons.

Hind-neck.—Crevix.

Hoar'y.—Of a pale silvery-gray.

Hood'ed.—Having the head conspicuously different in color from the rest of the plumage.

Hor'notine.—Yearling; a bird of the year.

Hu'merus.—The upper arm bone; or, the whole of the upper arm.

Hy'brid.—Cross between two species; mongrel.

Hy'oid.—Properly, pertaining to the *os hyoides*, or tongue bone, but frequently applied with reference to the tongue itself.

I.

Identifica'tion.—The determination of the species to which a given specimen belongs.
Im'bricated.—Fixed shingle-wise with over-lapping edge or end.
Immac'ulate.—Unspotted.
Immature'.—Not adult.
Incised'.—Cut out; cut away.
Incuba'tion.—The act of sitting on eggs to hatch them.
Indig'enous.—Native of a country.
Insectiv'orous.—Insect-eating.
Interorb'ital.—Between the eye-sockets.
Interscap'ular.—Between the shoulders.
Interscap'ulars.—Feathers of the back.
Irides'cent.—Glittering with many colors, which change in different lights.
I'ris.—Colored circle of the eye around the "dark spot" or pupil.

J.

Jug'ular.—Pertaining to the jugulum.
Jug'ulum.—Lower throat; lower foreneck.

L.

La'bel.—Card, ticket or similar slip of paper, parchment, etc., affixed to an object giving written information respecting it.
Lake Red.—A purplish red color, not so intense as crimson.
Lam'ina.—A thin plate or scale.
Lan'ceolate.—Lance-shaped; tapering narrowly at one end, less so at the other.
Lav'ender.—A very pale purplish color, paler and more delicate that lilac.
Lead-col'or.—Plumbeous.
Leg.—As generally used, synonymous with *tarsus;* as "legs and feet"=tarsi and toes.
Les'ser Wing-cov'erts.—The smaller wing-coverts, forming a more or less well defined tract immediately anterior to the middle coverts, and thence to the anterior border of the inner-wing.
Li'lac.—A light purple color, like the flowers of the lilac.
Limico'læ.—A group of shore-waders, as plover, snipe, etc.
Lin'ear.—Narrow, with straight parallel edges; line-like.
Li'ning of the Wing.—The under wing-coverts, especially the lesser and middle.
Lo'bate. } Furnished with membraneous flaps (said chiefly of *toes*).
Lobed. }
Lobe—Membraneous flap.
Longipen'nes.—A group of long-winged swimming birds, formally embracing the gulls and their allies, and the *Procellariidæ* petrels, albatrosses, and fulmars), but properly restricted to the *Laridæ*, *Rhynchopidæ* and *Stercorariidæ.*
Longitud'inal.—Running lengthwise, or in the direction of the antero-posterior axis of the body.
Lo'ral.—Pertaining to the lores.
Lore.—Space between eye and bill.
Low'er Parts.—The entire under surface, from chin to the crissum, inclusive.
Low'er Tail-cov'erts.—Feathers immediately under the tail.

M.

Mac'ulate.—Spotted.
Mad'der Brown.—A very rich reddish-brown color, more purplish than burnt sienna.
Ma'la.—Basal portion of outside of lower jaw, usually feathered.
Ma'lar.—Pertaining to the *mala.*

Ma'lar Re'gion.—The side of the lower jaw behind the horny covering of the mandible, usually feathered. In most birds it is a well-defined tract, extending backward from the base of the maxilla, beneath the lores, orbits, and auriculars, and bounded beneath by the chin and throat.

Man'dible.—Properly the *under* jaw, the upper being *maxilla.*

Mandibu'lar.—Pertaining to the lower jaw.

Man'tle.—In certain *Laridæ* and some other birds, *the mantle* is that portion of the upper plumage distinguished by the other parts of a peculiar and uniform color, suggesting, by its position, a mantle thrown over the body. It usually includes simply the back, scapulars, and wings and the term is perhaps appropriate only when thus restricted.

Marine'.—Pertaining to the sea.

Mar'gined.—Narrowly bordered with a different color.

Maroon'.—A rich brownish crimson; claret color.

Mask'ed.—Having the anterior portion of the head colored differently, in a conspicuous manner, from the rest of the plumage.

Max'illa.—The upper jaw, or upper mandible.

Max'illary.—Pertaining to the maxilla.

Me'dian. } Along the middle line.
Me'dial. }

Mel'anism.—A peculiar state of coloration resulting from excess of black or dark pigment. A frequent condition of hawks.

Metal'lic.—As applied to colors having a brilliant appearance, like burnished metal.

Mid'dle Toe.—The middle one of the three anterior toes. It is usually 4-jointed, and longer than the lateral toes. In numerical order it is the third, the hind toe, or hallux, being the first, and the inner toe the second. In zygodactylous birds it corresponds to the outer anterior toe, the fourth toe being reversed.

Mid'dle Cov'erts.
Mid'dle Wing-cov'erts.
Me'dian Cov'erts.
} The series of coverts, usually in a single transverse row, situated between the lesser and greater, or secondary coverts. They usually overlap one another in the reverse manner from the other coverts, the inner or upper edge being the one exposed.

Migra'tion,—Periodical change of abode, influenced chiefly by seasonal changes in climate, in which case the migration is regularly *periodical*, the vernal or spring migration being in the northern hemisphere, northward, the autumnal migration southward, but *vice versa* in the southern hemisphere. The migrations of many birds, however, are *irregular* or *erratic*, being prompted by the necessity of finding the requisite food-supply. The Passenger Pigeon (*Ectopistes migratoria*), American Robin (*Merula migratoria*), Cedar-bird (*Ampelis cedrorum*), etc., are migratory in this sense; while the tanagers, orioles, and others, which pass the summer only in northern latitudes and winter entirely within the tropics are periodical migrants.

Mir'ror.—See *speculum.*

Monog'amous.—Pairing; mating with a single one of the opposite sex. Birds of which the male assists in incubation and care of the young are called *doubly monogamous.*

Moustaché'.—In descriptive ornithology any conspicuous stripe on the side of the head beneath the eye.

N.

Nape.—The upper portion of the hind-neck or cervix.

Na'sal.—Pertaining to the nostrils.

Nata'tion.—Act of swimming.

Natato'res.—Swimming birds, as geese, ducks, gulls, etc.

Nic'titating Mem'brane.—The third or inner eye-lid of birds.

Nidifica'tion.—Nest-building; mode of nesting.

No'menclature.—The names of things, according to a recognized principle of naming, or those peculiar to any department of science. Various systems of nomenclature have been employed in the naming of animals and plants. Previous to the institution of the *binomial* system by Linnæus (first promulgated as to zoölogy in 1758), the *polynomial* system, or the use of several terms as to the name of a species, was much in vogue. That now employed is the *binomial* system of Linnæus, in which usually only two terms are used, the one generic, the other specific, but occasionally modified, according to the requirements of modern science, by the use of a third term after the specific one, for the designation of nascent species, or "subspecies."

Nor'mal.—Usual; regular.

Nos'tril.—The external opening of the organs of respiration.

Nu'cha.—The nape; upper part of cervix, next to occiput.

Nu'chal.—Pertaining to the nape.

Nup'tial plu'mage.—A particular plumage, peculiar to the breeding season, characteristic of some birds.

O.

Oblique'.—Indirect; crossing, or running diagonally.

Ob'long.—Longer than broad.

Obscure'.—Dark; not evident; faintly marked; little known.

Obtuse'.—Blunt. Opposed to *acute*.

Occip'ital.—Pertaining to the hind-head or occiput.

Oc'ciput.—The hind-head.

Ochra'ceous.
Och'reous.
Och'rey.
} A brownish orange color, or intense buff.

Olfac'tory.—Pertaining to the sense of smell.

Oliva'ceous.
Olive.
} A greenish-brown color, like that of olives.

Omniv'orous.—Feeding upon anything eatable; eating indiscriminately.

Oölog'ical.—Pertaining to oölogy.

Oöl'ogy.—The science of birds' eggs.

Opaque'.—In descriptive ornithology, the opposite of metallic, or brilliant, dull or without gloss.

O'ral.—Pertaining to the mouth.

Or'bit.—Eye-socket.

Or'bital Ring.—A ring or circle of color immediately surrounding the eye.

Or'der.—In classification a group between family and class.

Ornithol'ogy.—The science of birds.

Os cinine.—Pertaining to the *Oscines;* musical or capable of singing.

Os'cines.—The name of a natural group of singing passerine birds, comprising the singing-birds *par excellence*, characterized by a highly specalized vocal apparatus.

Out'er Web.—The outer web of a feather is that farthest from the central line of the body; in wing-feathers it is that farthest from the base of the wing, or toward the outer edge of the wing.

O'val.
O'vate.
O'void.
Ovoid'al.
} Egg-shaped; in a general sense oblong and curvilinear.

Ova'rium.
O'vary.
} The organ in which eggs are developed.

Ovip'arous.—Producing eggs which are developed after exclusion from the body.

Oviposi'tion.—Act of laying eggs.

P.

Pal'mate. } Web-footed; having the anterior toes full-webbed. Compare *Semipalmate* and *Totipalmate*.
Pal'mated. }
Pal'miped. }

Palu'dicole.—Marsh-inhabitating.

Pal'udine. } Pertaining to a marsh or swamp.
Palus'trine. }

Pap illa.—Small fleshy nipple-like prominence.

Par'asite.—In Oölogy, a species which constructs no nest and performs none of the duties of incubation or rearing of the young, but imposes on other birds for this purpose. A parasitic bird is also a species which obtains its food by systematically robbing other species; as the Parasitic Jaeger (*Stercorarius parasiticus*). Bald Eagle (*Haliœetus leucocephalus*).

Parasi'tic.—Habitually making use of other birds' nests.

Pas seres.—A group of birds including the sparrows and all the higher birds.

Pas'serine.—Sparrow-like. Belonging to the group of *Passeres*.

Pearl Blue.—A very pale purplish blue color.

Pearl Gray.—A very pale delicate blue-gray color, like the mantle of certain gulls.

Pec'tinate. } Having tooth-like projections, like those of a comb, as in the toes of
Pec'tinated. } a heron or grouse.

Pec'toral.—Pertaining to the breast.

Pec'tus.—The breast.

Pelag'ic.—Frequenting the high seas.

Phase.—Used more especially in the case of *dichromatic* species, as the *melanistic phase*, the *rufescent phase*, *etc.*

Pi'ci.—The name of a natural group, or order, of zygodactyle birds, comprising the woodpeckers and wrynecks.

Pig'ment.—Coloring-matter.

Pil'eus. } The cap; top of head from base of bill to nape.
Pil'eum. }

Pink.—A dilute rose-red color.

Pin'nate. } Having little wing-like tufts of elongated feathers on the side of the
Pin'nated. } neck.

Pin'tailed.—Having the central tail-feathers elongated and narrowly acuminate, as in the male Pintail Duck (*Dafila acuta*).

Pisciv'orous.—Fish-eating.

Plu'mage.—The feathers, collectively.

Plum'beous.—A deep bluish-gray color, like tarnished lead; lead-color.

Polyg'amous.—Mating with many females, as the domestic cock.

Poste'rior.—**(Upper or Lower) Parts.**—The hinder half of a bird, above or below.

Postoc'ular. } Back of, or posterior to, the eye.
Postor'bital. }

Pow'der-down Feath'ers.—Peculiar imperfect feathers, in a matted patch, which grow continually, and as constantly break down, with a scrufy exfoliation, and pervaded with a greasy substance; they are especially conspicuous in the heron tribe, but are also found elsewhere.

Pri'mary.—Any one of the quill-feathers of the "hand-wing," usually nine to eleven in number. Used chiefly in the plural, as distinguished from the secondaries, or those remiges which grow upon the forearm.

Pri'mary Cov'erts.—The series of stiff feathers, usually corresponding with the primaries in their graduation, which overlie the basal portion of the latter.

Punc tate.—Dotted.

Pu'pil.—Central black disc circumscribed by the iris; a *hole*, not a substance.

Pur'ple.—A color intermediate between red and blue.

Pygopo'des.—A group of swimming birds, containing the families *Podicipididæ*, *Colymbidæ* and *Alcidæ*, distinguished by the extreme posterior position of the legs.

Pyr'iform.—Pear-shaped.

Q.

Quad'rate.—Square.

Quar'ry.—Prey of raptorial birds.

Quill.—As generally used, one of the primary remiges; and perhaps best so restricted.

R.

Race.—A nascent species or a "form," which on account of the existence of intermediate specimens cannot be considered a species, no matter how great a degree of differentiation may have been reached. Races are distinguished as "Geographical" and "Local" according as to whether they occupy extensive or limited areas of country. Geographical races are usually correlative with definite geographical areas, being, in fact, the expression of geographical variation.—(*Ridgway.*)

Ra'mus.—Branch or fork, as the ramus of the lower mandible

Rapto'res.—An artificial group of birds, including the so-called birds of prey.

Rapto'rial.—Pertaining to the birds of prey.

Rec'trix.—Any one of the tail-feathers. The plural, *rectrices*, is chiefly used.

Recur'ved.—Curved upward.

Reflec'tion.—Change of color with different inclination to the light.

Re'gion.—Any portion of the body localized, as the *anal region*, *dorsal region*, etc.

Re'mex.—Quill of the wing. The plural *remiges* is generally employed.

Retic'ulate. } Marked with a network of lines.
Retic'ulated. }

Ric'tal.—Pertaining to the rictus.

Rictus.—The gape; sometimes restricted to the corner of the mouth.

Rosa'ceous. } A very pure purplish-pink, like some varieties of roses.
Rose Pink. }

Rose Red.—The purest possible purplish red color.

Ros'trum.—The beak; bill.

Round'ed.—A *rounded tail* has the central pair of feathers longest, the remainder successively a little shorter. A *rounded wing* is one in which the first primary is short, the longest quill being the third, fourth or fifth, or one nearly midway between the first and last.

Rudiment'ary.—Undeveloped; existing only in its beginning.

Ruff.—Set of lengthed or otherwise modified or peculiarly colored feathers around the throat or whole neck.

Ru'ga.—A ridge or wrinkle.

Ru'gose.—Wrinkled.

Rus'set.—A bright tawny-brown color, with a tinge of rusty.

S.

Sali'va.—Spittle; the secretion of the salivary glands.

Scanso'rial,—Capable of climbing as a woodpecker.

Scap'ular.—Pertaining to the shoulder blade, or *Scapula*

Scap'ulars. } Feathers of the scapular region.
Scap'ularies. }

Scarlet.—The purest possible red color, lighter and less rosy than carmine, richer and purer than vermilion.

Scolo'pacine.—Snipe-like.

Scu'tellate—Provided with *scutella*, or transverse scales.

Sec'ondary Cov'erts.—Properly, the posterior row of wing-coverts, which overlie the basal portion of the secondaries. The greater wing-coverts.

Sec'ondaries.
Sec'ondary Quills. } The long feathers of the forearm, which in the spread wing appear in a continuous row with the primaries.
Sec'ondary Rem'iges.

Ser'rate. } Toothed like a saw.
Ser'rated. }

Seta'ceous.—Bristly; bristled.

Sex'ual.—Pertaining to sex.

Shaft.—The mid-rib of a feather.

Shank.—Properly the *shin* or tibial segment of the leg.

Side of Neck.—The space included between the cervix and the jugulum.

Sides.—The lateral portions of the inferior surface of a bird's body, extending from near the armpits to and including the flanks. The sides are subdivisible into (1) sides of breast, (2) sides proper, and (3) flanks.

Slate co'lor.—A dark gray, or blackish gray color, less bluish in tint than plumbeous or lead color.

Spe'cies.—Aggregate of individuals related by genetic succession without notable change of physical characters whereby they are distinguished from all other beings.

Specif'ic.—Of, or relating to a species; as *specific* name, *specific* character.

Spec'ulum.—Mirror; brightly colored area on the secondaries, especially of certain ducks.

Spher'ical.—Having the form of a sphere or globe.

Spi'nose. } Having spines.
Spi'nous. }

Spu'rious.—False; imperfect; bastard; rudimentary.

Spu'rious Pri'mary.—The first primary when much reduced in size.

Spu'rious Wing.—The *alula* or *bastard wing*.

Squam'ose. } Scaly; scale like.
Squam'ous. }

Stage.—Used specially for the progressive plumages of birds, as the *adult stage*, *downy stage*, etc.

Steganopo'des.—A group of "Swimming Birds" characterized by having the hind toe united, on the inner side, to the inner anterior one by a full web.

Strag'ulum.—Mantle; back and folded wings taken together. Same as *pallium*.

Straw-col'or.—A very light impure yellow, like cured straw.

Stri'ate. } Streaked.
Stri'ated. }

Stri'dent.—Shrill.

Sub-ba'sal.—Near the base.

Subfam'ily.—A sub-division of a family including one or more genera.

Subge'nus.—A sub-division of a genus, of indefinite value, and frequently not recognized by name except in the grouping of species.

Sub-or'der.—A group intermediate in taxonomic rank between an order and a family.

Sub-spe'cies.—A nascent species; a variation, usually geographical, of a species, but not accorded full specific rank on account of the incompleteness of its differentiation; hence, usually a geographical race or form.

Subu'late.—Awl-shaped.

Sul'phur Yel'low.—A very pale pure yellow color, less orange in tint than dilute gamboge or lemon-yellow.

Supercil'iary.—Above the eye.

Superior'.—Lying over, above or uppermost.

Supra-auri'cular.—Situate above the auriculars.

Supralo'ral.—Situate above the lores.

Su'pra-or'bital.—Situate over the orbit.

Syn'onym.—A different word of the same or similar meaning. Also written *synonyme*.

Synon'ymous.—Expressing the same meaning in different terms.

Synon'ymy.—A collection of synonyms.

T.

Tail.—See *cauda.*

Tail-cov'erts.—The most posterior feathers of the body, or those which immediately cover the basal portion of the tail.

Tar'sal.—Relating the tarsus.

Tar'sus.—In descriptive ornithology, the leg of a bird, or that portion from the foot (that is, the toes) to the heel joint.

Taw'ny.—The color of tanned leather.

Tax'idermist.—A person who prepares and preserves the skins of animals, with the view to imitate their appearance in life.

Taxid'ermy.—Art of preparing and preserving skins so as to represent the appearance of the living animal.

Ter'minal.—At the end.

Ter'tials. **Ter'tiaries.** Properly, the inner quills of the wing, growing from the elbow or humerus and usually more or less concealed (in the closed wing) by the longer scapulars. Frequently, however, the graduated inner secondaries are incorrectly so-called, especially when distinguished, as they very often are, by different, color, size, or shape.

Thorac'ic.—Pertaining to the chest or thorax.

Tho'rax.—The chest; segment of the body enclosed by ribs, sternum (breast-bone), and certain vertebræ, containing heart and lungs.

Throat.—In descriptive ornithology, the space between the rami of the lower jaw, including also a small portion of the upper part of the foreneck.

Tib'ia.—Principal and inner bone of leg between knee and heel; but in descriptive ornithology, called "thigh."

Tib'ial.—Pertaining to the tibia.

To'mium.—The cutting-edge of the mandibles. Plural *tomia.*

Totipal'mate.—Having all four toes webbed.

Transverse'.—Crosswise; in direction at right angle with longitudinal axis of the body.

Tridac'tyle.—Three-toed.

Trino'mial.—Composed of three names. In Biology, a name composed of three terms,—a generic, a specific, and a subspecific.

Trun'cate.—Cut squarely off.

Type.—Of various significations in ornithology. The *type* of a genus is that species from which the generic characters have been taken, or which is specified as the standard; the *type* of a species is the particular specimen from which the species was originally described. The type, or typical, form of a group is that which answers best to the diagnosis of that group.

U.

Un'der Parts.—The entire lower surface of a bird, from chin to crissum, inclusive.

Un'guis.—A claw.

Up'per Parts.—The entire upper surface, from forehead to tail, inclusive.

U-shaped.—Having the form of the letter U.

V.

Vane.—The whole of a feather excepting the stem.

Vari'etal.—Pertaining to or having the characteristics of a variety.

Vari'ety.—Properly, an individual or unusual and irregular variation from the normal type of form or coloration, as the various breeds or "strains" of domestic animals. But the term is often, though improperly, applied to subspecies, or geographical races.

Vent.—The anus.

Ventral.—Pertaining to the belly.

Ventral Re'gion.—The feathers surrounding or immediately adjacent to the vent.

Vermic'ulate.
Vermic'ulated.
Vermic'ulation. } Marked with irregular fine lines, like the tracks of small worms.

Ver'miform.—Shaped like a worm; as a woodpecker's tongue.

Vermil'ion.—A very fine red color, lighter and less rosy than carmine, and not so pure or rich as scarlet.

Ver'nal.—Pertaining to spring.

Vibris'sa.—Bristly or bristle-tipped feather about the mouth of a bird.

Vina'ceous.—A brownish pink, or delicate brownish-purple color, like wine-dregs; a soft delicate wine-colored pink or purple.

Violet.
Viola'ceous. } A purplish-blue color, like the petals of a violet.

Vis'ceral.—Pertaining to the viscera.

Vis'cus.—Any interior organ of the body, but especially of the digestive system. The stomach is a *viscus;* the *intestines* are *viscera.*

V-shaped.—Having the form of the letter V.

W.

Wash'ed.—As if overlaid with a thin layer of different color.

Wa'ved.—Marked with narrow undulating lines of color.

Web.—The thin part or vane of a feather on either side of the shaft.

Whis'kered.—Having lengthened or bristly feathers on the cheeks.

Z.

Zone.—A broad band of color, completely encircling the circumference of a body.

Zoölog'ical.—Pertaining to zoölogy.

Zoöl'ogy.—Natural history of animals, of which ornithology is one department.

Zygodac'tyle.—Yoke-toed; having the toes in pairs, two before and two behind.

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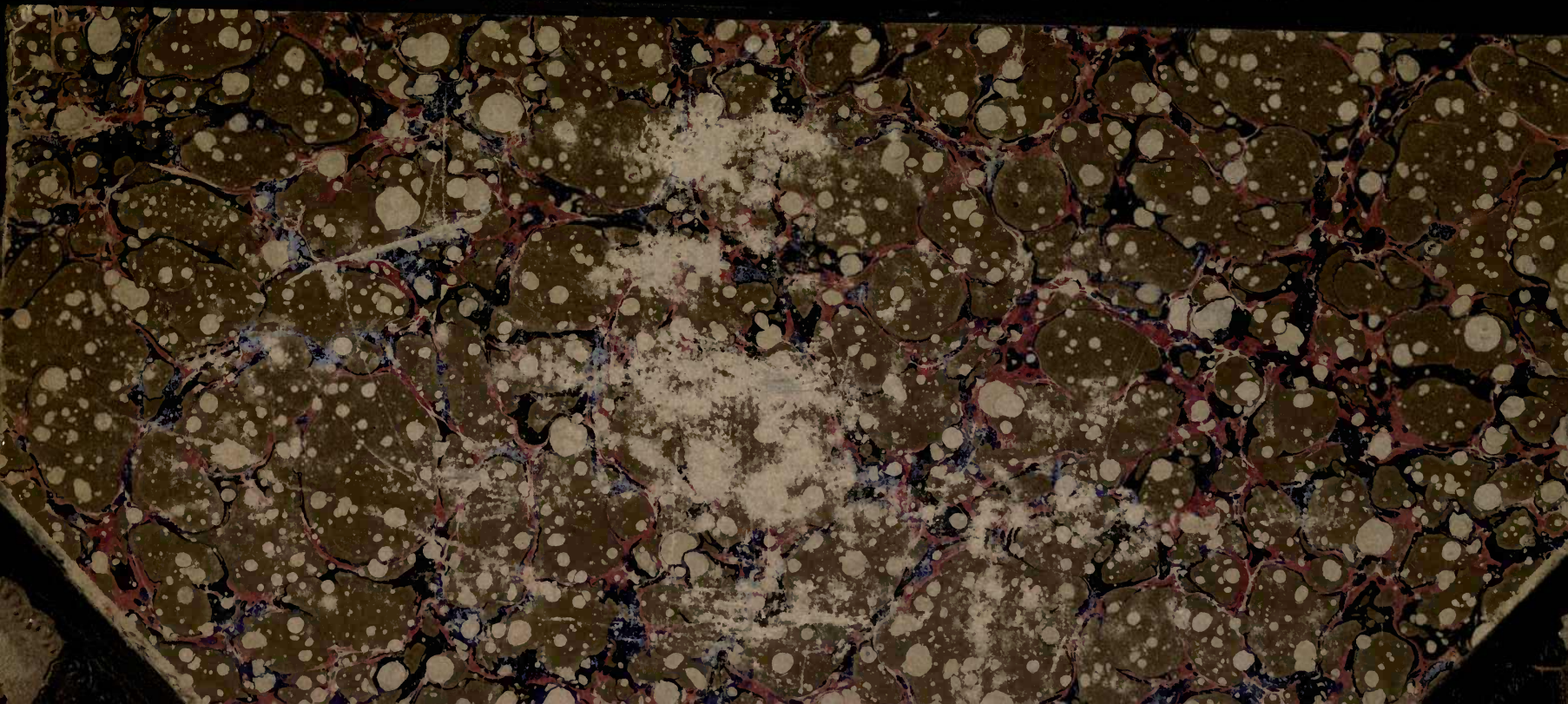
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